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and Environmental Problems*

SOLICITATION #: DE-PS26-00NT40777

TITLE: HIGH PRESSURE COMBUSTION KINETICS

DATE ISSUED: FEBRUARY 15, 2000

APPLICATION

DUE DATE: APRIL 24, 2000

CONTRACT

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Program Solicitation (PS)
Solicitation #DE-PS26-00NT40777
High Pressure Combustion Kinetics

SUMMARY

The United States Department of Energy, National Energy Technology Laboratory (DOE/NETL, or DOE), formerly the Federal Energy Technology Center, is competitively soliciting applications for a requirement entitled "High Pressure Combustion Kinetics".

1. SOLICITATION OBJECTIVES AND AREAS OF PROGRAM INTEREST

A Departmental Objective

To develop high efficiency, low pollutant emitting coal combustion systems that have sufficiently low technical uncertainties and opportunity costs to achieve commercial acceptance.

B Introduction and Background

The capital intensive nature of coal based power systems and the uncertainty of future environmental regulations and industry deregulation has stagnated the technological advancement of coal based power generation systems.

These realities are making the long-term competitiveness of coal uncertain. Competition from low cost and efficient options such as natural gas combined-cycle plants are reducing the dominance of coal in the electric power market. Likewise, new and more stringent environmental requirements, especially those related to ozone non-attainment, acid rain, and global climate change, further threaten the competitiveness of coal. Deregulation of the electric power industry is placing capital, risk, and financial return at the forefront of decision-making, placing even more pressure on the generation options that require large capital investments.

Vision 21, a U. S. Department of Energy program created to address these concerns has the objective to promote technology development partnership programs between government and industry for using abundant fossil energy resources efficiently and in an environmentally sound manner for co-production of electricity, clean fuels, and chemicals. Vision 21 is intended to develop the enabling technologies to allow the private sector to combine high-efficiency power technologies with advanced coal processing technologies and environmental control systems. The result will be energy complexes that produce cost-competitive multiple products that are in demand in the marketplace while discharging near-zero levels of pollution, including CO₂.

This solicitation specifically addresses development of enabling technologies for advanced coal combustion systems (suspension and crushed coal fired). It is anticipated that these advanced combustion systems will be operated at temperatures in the range of 1600 - 3000 degrees Fahrenheit, at pressures between 12 and 33 atmospheres, and will probably be operated as oxygen enhanced combustion (OEC) systems. This effort consists of assessing prior research in this area and performing applied kinetic studies to be used as a foundation for design and development of advanced combustion systems.

C Program Solicitation (PS) Objectives

The overall objective of this program solicitation is to obtain quantitative kinetic expressions required for flow simulation, design, and operation of high pressure (12-33 atm), high temperature (1600 - 3000 °F), combustion systems, which operate in reaction environments ranging from sub-stoichiometric to oxygen enhanced, to serve as a basis for development of advanced combustion power systems.

D Project Formulation

For the purpose of this solicitation, DOE is seeking proposals in order to obtain coal combustion kinetic data for flow simulation and reactor design to support technologies, processes, or concepts that have a high probability for commercial readiness within a relatively short time to address Vision 21 efficiency, environmental, cost and timing goals. Below is a summary of the Vision 21 goals. More details of the Vision 21 goals and overall program can be obtained at http://www.fe.doe.gov/coal_power/vision21/v21plan.pdf.

Summary of Vision 21 Efficiency Goals

Electrical Generation	60% (HHV) for coal-based systems (no credit for cogenerated steam)
Combined Heat and Power	85% (HHV) overall and must meet electrical generation goals
Fuel Plants Only	75% (LHV) fuel utilization when producing coal-derived fuels

Summary of Vision 21 Environmental, Cost, and Timing Goals

Environmental	Near-zero emissions of SO ₂ , NO _x , PM, trace elements, and organic compounds 40-50% reductions in CO ₂ emissions through efficiency improvements 0% CO ₂ emissions with sequestration
Costs	Products cost competitive with market clearing prices
Timing	2012 - Designs for most Vision 21 modules 2015 - Commercial plant designs

E Program Areas of Focus

Each proposal submitted in response to this program solicitation must focus on one of the distinct "Areas of Interest" detailed below. If an offeror is interested in conducting research in more than one area, the offeror must submit a separate proposal for each item.

Proposers should focus and integrate the combustion kinetics experimental program to extend and/or develop computational combustion systems models that can be used for evaluation and design of Vision 21 combustion systems. The proposals that include schematics and narrative descriptions of coal fueled energy plants (power, and/or transportation fuels, and/or chemicals) that include combustion systems that have a high potential to meet the Vision 21 goals referenced above based on extension of the state of the art or based on new novel systems approaches are sought. The experimental work proposed must be for the extension of or development of specific (proposer defined) design and performance models to characterize combustion systems defined in the areas of interest described below. The data, algorithms, design and performance models must be developed for incorporation into ASPEN simulations.

(1) **Area of Interest 1: Suspension Fired Combustion Systems**

Combustion of coal in the form of particles suspended in a gas stream is utilized in three kinds of furnaces: 1) pulverized coal, 2) cyclone, and 3) fluidized bed. However, proposals submitted under **Area of Interest 1** - Suspension Fired Combustion systems for this solicitation should not include fluidized beds as fluidized beds are the subject of **Area of Interest 2** of this solicitation.

For combustion in pulverized coal furnaces, coal is ground into small particles (70-80% by mass smaller than 75 microns). For cyclone furnaces, the coal is only crushed, the maximum size of particles being several millimeters in diameter.

Due to significant differences in particle sizes, gas velocities, and temperatures among different furnace systems, the process of combustion of coal particles varies considerably from one system to another, which restricts any attempt at generalization.

Future power systems designs will be influenced by many factors, including fuel availability, system reliability, environmental and financial constraints, the availability of advanced materials and technologies, and co-production requirements. Proposals that show high potential of meeting Vision 21 goals will be considered favorable under this solicitation. It is envisioned that these advanced combustion systems will fall within the following operating ranges:

Temperature:	2000 - 3000 degrees Fahrenheit
Pressure:	12-33 atmospheres
Oxygen level:	substoichiometric - 100 percent.

The relevance of substoichiometric systems indicates the possibility and potential for staged combustion processes. Kinetic expressions and computational models are not required to cover the entire range of operating variables. Data and models that cover a portion of the ranges above or that are outside of the ranges above (with justification) that fall within the budgetary constraints of this solicitation are acceptable.

In addition to the above operating ranges, it is envisioned that advanced combustion systems will facilitate carbon dioxide separation or use for useful by-product production.

The literature on coal combustion is extensive. This information has made it possible to improve the accuracy of comprehensive computational combustion models to the point that equipment designers have begun to use codes to lead state-of-the-art combustion system design efforts. Unfortunately, computational models based on accurate experimental data that describe combustion systems that have potential to achieve vision 21 goals do not exist.

Proposers should make the most of the existing data and literature base while defining and delineating a research and development program composed of the proper mix of analysis, experimentation, and simulation/modeling of suspension fired combustion systems based on a systems approach to process design.

It is essential to have a proper computational model framework that describes the suspension fired system which incorporates significant features of its behavior and can be used to assess the combined effects of chemical rate processes and physical phenomena such as diffusion and heat transfer on the performance of the system. Since no computational model is ever the perfect expression of the real flow patterns, the simplifying assumptions on which it is based must be clearly presented. Model predictions (existing models or extrapolations thereof) that identify the experimental operating ranges, that specify the physical and analytical requirements of the experimental program, and that show the potential of the proposed work toward meeting the goals of vision 21 combustion systems must be presented in the proposal. The experimental program must be defined based on needs of the computational model and lack of information in the literature. Pollutant and trace specie emissions such as sulfur compounds, NO_x, N₂O, and Hg shall be measured as part of the experimentation as a basis for commercial plant emission predictions and pollutant removal equipment needs.

This effort is targeted to benefit designers and evaluators of advanced systems by making predictive models available that enable effective design and evaluation of the performance potential of prospective designs and systems. It is anticipated that experimental data is needed to validate, modify, or refute and develop specific models (computational and ASPEN) for suspension fired systems.

Proposals submitted under this solicitation should present a program composed of the proper mix of analysis, carefully crafted lab to small bench scale experimentation, and simulation/modeling of suspension fired combustion systems based on a systems approach aimed at defining the critical process and combustion behavior of advanced combustion systems. Proposed work shall encompass pollutant formation, char reactivity and ash behavior. If in-situ or combined combustion/pollutant abatement methods are proposed these shall be detailed in the proposal and included as part of the combustion system model. Experiments can be planned on a range of coals but Pittsburgh #8 coal must be included in the coals that will be used. The project must carefully integrate data collection and modeling of critical processes.

(2) Area of Interest 2: Fluidized Combustion Systems

Fluidized bed combustion of coal involves the burning of coal particles in a hot fluidized bed of inert particles, ash, and SO_2 acceptor, usually limestone. Fluidized bed combustors are currently under active development because of the following advantages: greatly enhanced flexibility in fuel use, smaller overall plant foot print and thus lower costs, especially lower in costs than conventional systems in meeting environmental regulations (SO_2 easily removed in the bed and NO_x production reduced through lower combustion temperatures) and simplified operation because of greatly reduced slagging.

Fluidized bed combustion systems can be of three different types 1) bubbling, 2) circulating, or 3) transport fluidization systems. The differences among the three being particle size and gas velocity of operation.

For combustion in bubbling beds with under bed feeding, coal is generally sized with a top size of about 10 millimeters and typically less than 20 percent less than 600 micrometers. Bed superficial gas velocities for bubbling beds are typically in the range of 120 - 300 cm/s. For circulating fluidized beds (CFB's) coal is sized with a d_{50} in the range of 500 - 1000 micrometers (d_{50} is the diameter at the 50 percent point of a Rosin-Rammler logarithmic probability plot of particle size versus percent passing through a given sieve size) and a top size in the range of 3 - 9 millimeters. Bed velocities for CFB's are typically in the range of 500 - 600 cm/s. Coal size for transport fluidization systems typically have a d_{50} of 100 -200 micrometers and operate as high as 1200 cm/s.

Proposals and research in the areas of circulating and transport fluidization combustion systems are of primary importance as it is envisioned that advanced combustion systems will be of one of these types.

Due to significant differences in particle sizes, gas velocities, and temperatures among different furnace systems, the process of combustion of coal particles varies considerably from one system to another, which restricts any attempt at generalization.

Future power systems designs will be influenced by many factors, including fuel availability, system reliability, environmental and financial constraints, the availability of advanced materials and technologies, and co-production requirements. Combustion projects that show high potential of meeting Vision 21 goals will be considered responsive to this solicitation. It is envisioned that these advanced combustion systems will fall within the following operating ranges:

Temperature:	1600 - 2200 degrees Fahrenheit
Pressure:	12-33 atmospheres
Oxygen level:	substoichiometric - 100 percent.

The relevance of substoichiometric systems reveals the possibility and potential for staged combustion processes. Kinetic expressions and computational design models are not required to cover the entire range of operating variables. Data and design models that cover a portion of the ranges above or that

are outside of the ranges above (with justification) that fall with the budgetary constraints of this solicitation are acceptable.

In addition to the above operating ranges, it is envisioned that advanced combustion systems that facilitate carbon dioxide separation or use for useful by-product production will be developed.

The literature on coal combustion is extensive. This information has made it possible to improve the accuracy of comprehensive computational combustion models to the point that equipment designers have begun to use codes to lead state-of-the-art combustion system design efforts. Unfortunately, computational models based on accurate experimental data that describe fluidized bed combustion systems that have potential to achieve vision 21 goals do not exist.

Proposers should make the most of the existing data and literature base while defining and delineating a research and development program composed of the proper mix of analysis, experimentation, and simulation/modeling of fluidized bed combustion flow systems based on a systems approach to process design. The links among design modeling, experimentation, and reactor design are critical. The proposers best illustrating these linkages and addressing areas such as the hydrodynamics of the flow condition, particle/particle cluster size affects, space and time resolution, and the transient nature of the fluidization process will be highly regarded.

It is essential to have a proper computational model framework that describes the fluidized system which incorporates significant features of its behavior and can be used to assess the combined effects of chemical rate processes and physical phenomena such as diffusion and heat transfer on the performance of the system. Since no computational model is ever the perfect expression of the real flow patterns, the simplifying assumptions on which it is based must be clearly presented. Model predictions showing its applicability must be presented in the proposal. The experimental program should be defined based on needs of the computational model and lack of information in the literature. Pollutant and trace specie emissions such as sulfur compounds, NO_x, N₂O, and Hg shall be measured as part of the experimentation as a basis for commercial plant emission predictions and pollutant removal equipment needs.

This effort is targeted to benefit designers and evaluators of advanced systems by making predictive models available that enable effective design or evaluation of the performance potential of prospective designs and systems. It is anticipated that experimental data is needed to validate, modify, or refute and develop specific models (computational and ASPEN) for fluidized bed combustion systems.

Proposals submitted under this solicitation should present a program composed of the proper mix of analysis, carefully crafted lab to small bench scale experimentation, and simulation/modeling of fluidized bed combustion flow systems based on a systems approach aimed at defining the critical process and combustion behavior of advanced combustion systems. Proposed work shall encompass pollutant formation, char reactivity and ash behavior. If in-situ or combined combustion/pollutant abatement methods are proposed these shall be included in the combustion system model. Experiments can be planned on a range of coals but Pittsburgh #8 coal must be included in the coals that will be used. The project must carefully integrate data collection and modeling of critical processes.

MODEL COOPERATIVE AGREEMENT

SECTION I - Face Page (DOE F 4600.1)

1.1 FACE PAGE DOE FORM 4600.1 NOTICE OF FINANCIAL ASSISTANCE AWARD (JAN 1999)

DOE F 4600.1#

(08/93)

U.S. DEPARTMENT OF ENERGY

NOTICE OF FINANCIAL ASSISTANCE AWARD*(See Instructions on Reverse)*

Under the authority of Public Law

and subject to legislation, regulations and policies applicable to (cite legislative program title):

TO BE COMPLETED AT TIME OF AWARD

1. PROJECT TITLE				2. INSTRUMENT TYPE <input type="checkbox"/> GRANT <input checked="" type="checkbox"/> COOPERATIVE AGREEMENT			
3. RECIPIENT (Name, address, zip code, area code and telephone no.) TBD				4. INSTRUMENT NO.		5. AMENDMENT NO.	
				6. BUDGET PERIOD FROM: THRU:		7. PROJECT PERIOD FROM: THRU:	
8. RECIPIENT PROJECT DIRECTOR (Name and telephone no.)				10. TYPE OF AWARD <input type="checkbox"/> NEW <input type="checkbox"/> CONTINUATION <input type="checkbox"/> RENEWAL <input type="checkbox"/> REVISION <input type="checkbox"/> SUPPLEMENT			
9. RECIPIENT BUSINESS OFFICER (Name and telephone no.)							
11. DOE PROJECT OFFICER (Name, address, zip code, telephone no.)				12. ADMINISTERED FOR DOE BY (Name, address, zip code, telephone no.)			
13. RECIPIENT TYPE <div style="display: flex; justify-content: space-between;"><div><input type="checkbox"/> STATE GOV'T <input type="checkbox"/> INDIAN TRIBAL GOV'T <input type="checkbox"/> HOSPITAL</div><div><input type="checkbox"/> FOR PROFIT ORGANIZATION <input type="checkbox"/> INDIVIDUAL</div></div> <div style="display: flex; justify-content: space-between;"><div><input type="checkbox"/> LOCAL GOV'T <input type="checkbox"/> INSTITUTION OF HIGHER EDUCATION <input type="checkbox"/> OTHER NONPROFIT ORGANIZATION</div><div><input type="checkbox"/> C <input type="checkbox"/> P <input type="checkbox"/> SP <input type="checkbox"/> OTHER (Specify) _____</div></div>							
14. ACCOUNTING AND APPROPRIATIONS DATA:						15. EMPLOYER I.D. NUMBER	
a. Appropriation Symbol		b. B&R Number		c. FT/AFP/OC			
16. BUDGET AND FUNDING INFORMATION							
a. CURRENT BUDGET PERIOD INFORMATION				b. CUMULATIVE DOE OBLIGATIONS			
(1) DOE Funds Obligated This Action \$				(1) This Budget Period \$ [Total of lines a.(1) and a.(3)]			
(2) DOE Funds Authorized for Carry Over \$				(2) Prior Budget Periods \$			
(3) DOE Funds Previously Obligated in this Budget Period \$				(3) Project Period to Date \$ [Total of lines b.(1) and b.(2)]			
(4) DOE Share of Total Approved Budget \$							
(5) Recipient Share of Total Approval Budget \$							
(6) Total Approved Budget \$							
17. TOTAL ESTIMATED COST OF PROJECT \$ _____ (This is the current estimated cost of the project. It is not a promise to award nor an authorization to expend funds in this amount.)							
18. AWARD AGREEMENT TERMS AND CONDITIONS This award/agreement consists of this form plus the following: a. Special terms and conditions. b. Applicable program regulations (specify) _____ (Date) _____. c. DOE Assistance Regulations, 10 CFR Part-600, as amended. d. Application/proposal dated _____, <input type="checkbox"/> as submitted <input type="checkbox"/> with changes as negotiated.							
19. REMARKS							
20. EVIDENCE OF RECIPIENT ACCEPTANCE				21. AWARDED BY			
(Signature of Authorized Recipient Official)				(Signature)			
(Date)				(Date)			
(Name)				(Name)			
(Title)				Contracting Officer (Title)			

INSTRUCTIONS

(This form shall be completed in accordance with the following instructions. For any clarification or additional information that might be needed, consult the appropriate section of the DOE Financial Assistance Procedures Manual (DOE-FAPM).)

Insert in the space provided, in the line which begins, "Under the Authority of Public Law ...," the number and the name of the Public Law which authorizes this award. On the line below, enter the title of the pertinent program.

Block 1 — Enter the project title as it appears in the SF-424 or equivalent application/proposal face sheet.

Block 2 — Place a checkmark in the box beside the appropriate financial assistance instrument.

Block 3 — Enter the name, address, and telephone number of the applicant/proposer as it appears in the SF-424 or equivalent application/proposal face sheet.

Block 4 — Enter the instrument number. (See DOE-FAPM.)

Block 5 — Enter the appropriate amendment number. (See DOE-FAPM for guidance.)

Block 6 — Enter the starting date and expiration date for the current budget period. If a budget period is being changed, enter the starting date and expiration date for the budget period, as changed.

Block 7 — Enter the starting date and anticipated completion date for the project. If a project period is being changed, enter the starting date and anticipated completion date for the project period, as changed.

Block 8 — Enter the name and telephone number of the individual designated by the applicant/proposer as the director of the project.

Block 9 — Enter the name and telephone number of the individual designated by the applicant/proposer as the contact for all business matters.

Block 10 — Place a checkmark in the box opposite the term which identifies the type of action being taken. (The terms are defined in the DOE-FAPM.)

Block 11 — Enter the name, address, and telephone of the individual designated by the DOE program office as the project officer.

Block 12 — Enter the name, address, and telephone number of the individual/organization who will administer the agreement for DOE.

Block 13 — Place a checkmark in the box beside the applicable recipient type. If the recipient is a for-profit organization, also check one of the lower boxes as follows: "C" for Corporation, "P" for Partnership, and "SP" for Sole Partnership. If the recipient is of a type not indicated, place a checkmark in the box beside "Other," and identify the recipient type in the space provided.

Block 14 — Enter where indicated, the appropriation symbol, B&R number, Fund Type (FT)/AFP Code (AFP)/Objective Class (OC) and CFA Number from the Procurement/Financial Assistance Request Authorization (DOE Form PR-799A). Completion Block 14.d. is required only for awards made by Headquarters.

Block 15 — Enter the applicant's/proposer's Federal Employer Identification No. from the SF-424 or equivalent application/proposal face sheet, or if the applicant/proposer is an individual, enter his/her social security number.

Block 16 — Entries should be made as follows. (If no dollar entry is appropriate, a zero should be entered to indicate there was no error of omission.)

Line a.(1) — Enter the amount of DOE funds obligated by this action.

Line a.(2) — Enter the amount of DOE funds not expended in prior budget period(s), if any, authorized by DOE for expenditure in the current budget period.

Line a.(3) — Enter the amount of DOE funds previously obligated in the current budget period.

Line a.(4) — Enter DOE's share of the total approved budget shown in Line a.(6).

Line a.(5) — Enter the recipient's share of the total approved budget shown on Line a.(6).

Line a.(6) — Enter the total approved budget for the current budget period. (Add the amounts in Lines a.(4) and a.(5).)

Line b.(1) — Enter the amount of DOE funds obligated in the current budget period. (Add the amounts in Lines a.(1) and a.(3).)

Line b.(2) — Enter the amount obligated by DOE in prior budget periods.

Line b.(3) — Enter the amount obligated by DOE in the project period to date. (Add the amounts in Lines b.(1) and b.(2).)

Block 17 — Must be completed for cooperative agreements. Contracting Officers may exercise discretion as to whether to complete it for grants. Enter the blank provided, the amount which represents the current estimate of total funds and dollar value of in-kind contributions (both DOE and recipient shares) needed to carry out the entire project. Include all funds and contributions previously provided, those being provided by this action, and all anticipated future obligations and contributions of both parties.

Block 18 — Complete as follows.

Item a. — No entry necessary.

Item b. — Enter the legal citation from the Code of Federal Regulations or Federal Register and the effective date for the program regulations applicable to the program under which the award is made.

Item c. — Mark the box beside B for grants or C for cooperative agreements.

Item d. — In the blank provided, enter the date of the application/proposal. (If SF-424 is used, see block 23c on page 1.) Place a checkmark in the appropriate box to indicate whether the application/proposal was accepted as submitted or with negotiated changes.

Block 19 — Enter any explanation or advisory comments which are required for, or applicable to, this action.

Block 20 — Will be completed by the recipient.

Block 21 — The Contracting Officer shall sign and date the top line. His/her name and title should be entered on the next two lines. This box must be signed prior to forwarding to recipient.

SECTION II -- SPECIAL TERMS AND CONDITIONS

2.1 PREVAILING REGULATIONS (NOV 1998)

As indicated on the face page, Block 18c, this Award is subject to the DOE Assistance Regulations of Title 10, Code of Federal Regulations, Part 600. This set of regulations may be found in most major libraries or on the World Wide Web at: <http://www.pr.doe.gov/fahome.html>

2.2 ORDER OF PRECEDENCE (DEC 1999)

In the event of any inconsistency among the provisions of this agreement, the inconsistency shall be resolved by giving precedence as follows: (a) Applicable Public Laws; (b) the special terms and conditions or schedule of articles; (c) 10 CFR Part 600; and (d) other documents, exhibits and attachments.

2.3 SUBSTANTIAL INVOLVEMENT BETWEEN DOE AND THE RECIPIENT (JAN 1999)

There will be substantial involvement between the DOE and the Recipient during performance of this Cooperative Agreement.

[TBD - The following types of activities are generally viewed as substantial involvement:

- Involvement in either the technical or business management aspects of the project or both;
- Desire to have greater control over the budget;
- Providing extensive assistance or training to a "high risk" organization;
- Substantial involvement and contribution to technical aspects of the effort are necessary for its accomplishment;
- Project, as proposed, would not be possible without extensive DOE collaboration;
- Option to immediately halt an activity;
- Review and approval during the project period of one stage before work can begin on a subsequent stage in sharing of the responsibility for the direction of the project. (i.e. The DOE will participate in establishing and approving a work plan, which will identify essential and significant milestones necessary for completion of the project. This work plan will be used to determine whether or not to proceed with subsequent tasks of the Statement of Project Objectives.)]

2.4 COST SHARING (DEC 1999)

Allowable project costs shall be share in the ratio set forth below:

DOE:	[TBD - maximum 80%]
Recipient:	[TBD - minimum 20%]
Total:	100%

In the event allowable costs exceed [TBD], such cost shall be borne solely by the recipient.

2.5 FUNDING (JULY 1999)

Funding in the amount of [TBD] is obligated and made available for payment of the Government's share of allowable costs.

The Recipient shall promptly notify the Contracting Officer in writing of the estimated amount of additional funds, if any, are required to continue timely performance under this award and when the funds will be required. The maximum DOE obligation to the Recipient is shown in Block 16 of the DOE Form 4600.1. The Government is not obligated to increase the total dollar amount funded and the Recipient is not obligated to continue performance under this award or otherwise incur costs to the extent that the Government's share of allowable costs would exceed the amount obligated by the Government.

2.6 ALLOWABLE PREAWARD COSTS (MAR 1999)

The Recipient is entitled to reimbursement of preaward costs in the amount not to exceed [TBD] of DOE obligations. These costs are limited to work associated with performance of [TBD], incurred during the period starting on [TBD] through the effective start date of this award (Block 7, DOE F 4600.1).

2.7 CONTINUATION APPLICATION (DEC 1999)

Funding for each budget period within the approved project period shall be contingent on DOE approval of a continuation application submitted no later than 60 days prior to the end of the current budget period. The continuation application shall be submitted on the SF 424 in accordance with 10 CFR 600.26. Forms for submission of continuation applications can be found at <http://www.netl.doe.gov/business/forms/forms.html>.

2.8 METHOD OF PAYMENT (DEC 1999)

The method of payment to the Recipient shall be accomplished by the method checked below:

- ☒ Advance in accordance with 10 CFR 600.122(b)
- ☐ Reimbursement in accordance with 10 CFR 600.122(e)
- ☐ Other in accordance with 10 CFR 600.122

The Recipient shall request advances or reimbursements using the Standard Form SF 270, Request for Advance or Reimbursement, and shall complete Blocks 1-11 and 13.

Note 1: If the block designating payment by Advance is used, the Recipient is allowed advances not to exceed the funding required to cover expenditures for any succeeding one month time period. Such requests for monthly advances shall be prepared using the Standard Form SF 270 in an original and two (2) copies.

The original is to be submitted to:

U. S. Department of Energy
Oak Ridge Financial Services
P. O. Box 4787
Oak Ridge, TN 37831

The two copies are to be submitted to:

U. S. Department of Energy
National Energy Technology Laboratory
Commercial Payments Center
P. O. Box 10940, MS 921-107
Pittsburgh, PA 15236-0940

Note 2: If the block designating payment by Reimbursement is used, the Recipient shall submit the request for payment for costs incurred using the Standard Form SF 270 in an original and two (2) copies as indicated in Note 1 above. This request shall not be submitted more frequently than monthly.

2.9 NOTICE OF INVOICE PROCESSING BY SUPPORT CONTRACTOR (DEC 1999)

A support service contractor performs the function of processing of all invoices submitted to the National Energy Technology Laboratory, against its awards. Therefore, this contractor has access to your business confidential cost/rate information. A special provision in this contractor's award requires the confidential treatment by all contractor employees of any and all business confidential information of other contractors and financial assistance recipients to which they have access.

2.10 ACKNOWLEDGMENT OF FEDERAL FUNDING (NOV 1998)

When issuing statements, press releases, requests for proposals, bid solicitations, and other documents describing this project, the Recipient shall clearly state (1) the percentage of the total cost of the project which will be financed with Federal money, and (2) the dollar amount of Federal funds for the project.

2.11 REAL PROPERTY - NONE (JAN 1999)

No real property may be acquired under this award.

2.12 RECIPIENT ACQUIRED PROPERTY (MAY 1999)

Reference Attachment D for a listing of property authorized for acquisition under this award. Property acquired by the Recipient under this award shall be managed in accordance with 10 CFR 600.130 to 10 CFR 600.137, and reported as prescribed in Attachment B, Federal Assistance Reporting Checklist.

2.13 RECIPIENT ACQUIRED PROPERTY - NONE (JAN 1999)

No Recipient acquired property is anticipated under this award.

2.14 FEDERALLY OWNED PROPERTY (GOVERNMENT-FURNISHED) - NONE (JAN 1999)

No Government-furnished property is provided under this award.

2.15 KEY PERSONNEL (NOV 1998)

Recipient personnel considered to be essential and key to the work being performed hereunder are specified below.

<u>NAME</u>	<u>TITLE</u>	<u>TELEPHONE</u>
[TBD]	[TBD]	[TBD]

The personnel specified in this clause are considered to be essential to the project. Before diverting any key personnel to work outside the scope of this award, the Recipient shall notify the Contracting Officer reasonably in advance and shall submit justification (including proposed substitutions) in sufficient detail to permit evaluation of the impact on the project. No key personnel may be substituted without the Contracting Officer's approval. Such approval shall be obtained in advance of the substitution, except that the Contracting Officer may ratify a substitution which, because of exigent circumstances, was made before the Recipient could request and/or obtain the Contracting Officer's approval.

2.16 PUBLIC ACCESS TO INFORMATION (JULY 1999)

The Freedom of Information Act, as amended, and the DOE implementing regulations (10 CFR 1004) require DOE to release certain documents and records regarding awards to any person who provides a written request. The intended use of the information will not be a criterion for release. These requirements apply to information held by DOE and do not require Recipients, their subgrantees, or their contractors to permit public access to their records.

2.17 COMPLIANCE WITH BUY AMERICAN ACT (DEC 1999)

In accepting this award, the Recipient agrees to comply with sections 2 through 4 of the Act of March 3, 1933 (41 U.S.C. 10a-10c, popularly known as the "Buy American Act"). The Recipient should review the provisions of the Act to ensure that expenditures made under this award are in accordance with it.

2.18 NOTICE REGARDING THE PURCHASE OF AMERICAN-MADE EQUIPMENT AND PRODUCTS -- SENSE OF CONGRESS (DEC 1999)

It is the sense of the Congress, that to the greatest extent practicable, all equipment and products purchased with funds made available under this award should be American-made.

2.19 LOBBYING RESTRICTION (DEPARTMENT OF INTERIOR AND RELATED AGENCIES APPROPRIATIONS ACT, 2000) (DEC 1999)

The awardee agrees that none of the funds obligated on this award shall be made available for any activity or the publication or distribution of literature that in any way tends to promote public support or opposition to any legislative proposal on which Congressional action is not complete. This restriction is in addition to those prescribed elsewhere in statute and regulation.

A copy of the DOE "Lobbying Brochure" which provides a summary of the statutory and regulatory restrictions regarding lobbying activities for Federal contractors can be found at <http://www.pr.doe.gov/lobbying.html>.

2.20 NOTICE REGARDING UNALLOWABLE COSTS AND LOBBYING ACTIVITIES (NOV 1998)

Recipients of financial assistance are cautioned to carefully review the allowable cost and other provisions applicable to expenditures under their particular award instruments. If financial assistance funds are spent for purposes or in amounts inconsistent with the allowable cost or any other provisions governing expenditures in an award instrument, the government may pursue a number of remedies against the Recipient, including in appropriate circumstances, recovery of such funds, termination of the award, suspension or debarment of the Recipient from future awards, and criminal prosecution for false statements.

Particular care should be taken by the Recipient to comply with the provisions prohibiting the expenditure of funds for lobbying and related activities. Financial assistance awards may be used to describe and promote the understanding of scientific and technical aspects of specific energy technologies, but not to encourage or support political activities such as the collection and dissemination of information related to potential, planned or pending legislation.

2.21 YEAR 2000 COMPLIANCE (NOV 1998)

Year 2000 compliant means, with respect to information technology, the information technology accurately processes date/time data (including, but not limited to, calculating, comparing, and sequencing) from, into, and between the twentieth and twenty-first centuries, and the years 1999 and 2000 and leap year calculations, to the extent that other information technology, used in combination with the information technology being acquired, properly exchanges date/time data with it.

The Recipient assures, by acceptance of this award, that items delivered under this contract are year 2000 compliant.

2.22 REPORTING (NOV 1998)

Failure to comply with the reporting requirements contained in this award will be considered a material noncompliance with the terms of the award. Noncompliance may result in a withholding of future payments, suspension or termination of the current award, and withholding of future awards. A willful failure to perform, or of unsatisfactory performance of this and/or other financial assistance awards, may also result in a debarment action to preclude future awards by Federal agencies.

2.23 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) -- PRIOR APPROVALS (DEC 1999)

The National Environmental Policy Act of 1969 (NEPA) requires that all Federal agencies consider the impacts of their projects on the human environment. As part of the DOE's NEPA requirements, the Recipient shall be required to supply to the DOE certain environmental information. DOE funds may only be expended by the Recipient on [TBD] activities, or in a manner inconsistent with 10 CFR 1506.1, until DOE notifies the Recipient that all NEPA requirements have been satisfied.

2.24 SAFETY & HEALTH AND ENVIRONMENTAL PROTECTION (JAN 1999)

The Recipient shall implement the DOE work in accordance with all applicable Federal, State, and local laws, including codes, ordinances, and regulations, covering safety, health, and environmental protection.

The Recipient agrees to include this clause in first-tier subcontracts and agrees to enforce the terms of this clause.

2.25 PERMITS AND LICENSES (AUG 1999)

Within sixty (60) days of award, the Recipient shall submit to the DOE Contracting Officer Representative (COR) a list of ES&H approvals that, in the Recipient's opinion, shall be required to complete the work under this award. The list shall include the topic of the approval being sought, the approving authority, and the expected submittal/approval schedule. The COR shall be notified as specific items are added or removed from the list and processed through their approval cycles.

The Recipient agrees to include this clause in first-tier subcontracts and agrees to enforce the terms of this clause.

SECTION III -- INTELLECTUAL PROPERTY PROVISIONS

3.1 INTELLECTUAL PROPERTY PROVISIONS (JAN 1999)

The patent and technical data clauses included in this section apply to this award. As used in these applicable clauses, the term "Patent Counsel" refers to the following point of contact:

Intellectual Property Law Division
U.S. Department of Energy
Chicago Operations Office
9800 South Cass Avenue
Argonne, IL 60439

In any of the FAR and DEAR clauses contained in this section, use of the term "Contract" means "Award" and "Contractor" means "Recipient."

The Recipient shall include intellectual property clauses in any contract awarded in accordance with requirements of the clauses in this section and of 10 CFR Part 600.27.

3.2 PUBLICATION OF RESULTS/ACKNOWLEDGMENT STATEMENT (JAN 1999)

Publication of the results of the award is encouraged subject to any applicable restrictions in 10 CFR 600.27 (Patent and Data Provisions). Publications, as well as reports prepared under this award shall contain the following acknowledgment statement:

"This (describe material) was prepared with the support of the U.S. Department of Energy, under Award No. DE-FC26-00NT[TBD]. However, any opinions, findings, conclusions, or recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of the DOE".

3.3 RECIPIENT PRESS RELEASES (APR 1998)

The DOE policy and procedure on planned press releases requires that all Recipient press releases be reviewed and approved by DOE prior to issuance. Therefore, the Recipient shall, at least ten (10) days prior to the planned issue date, submit a draft copy to the Contracting Officer of any planned press releases related to work performed under this award. The Contracting Officer will then obtain necessary reviews and clearances and provide the Recipient with the results of such reviews prior to the planned issue date.

3.4 CONFIDENTIAL BUSINESS INFORMATION (DEC 1999)

Data represented to the Department as being confidential business information, and which does not include "Technical Data" as that term is defined in 52.227-14 Rights in Data General clause of this agreement, shall be submitted as an attachment to the required reports and will be withheld from disclosure outside NETL to the extent permitted by law, provided such attachment and each page therein is stamped with the following legend and no other:

CONFIDENTIAL BUSINESS INFORMATION

The Recipient considers the data furnished herein to contain confidential business information which is to be withheld from disclosure outside NETL to the extent permitted by law.

3.5 CLAUSES INCORPORATED BY REFERENCE (AUG 1999)

This solicitation may incorporate one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

Federal Acquisition Regulations (FAR) (Clauses starting with 52):
<http://www.arnet.gov/far/index.html>

Department of Energy Acquisition Regulations (DEAR) (Clauses starting with 952):
<http://www.pr.doe.gov/dear.html>

3.6 52.227-1 AUTHORIZATION AND CONSENT. (JUL 1995) -- ALTERNATE I (APR 1984)

- (a) The Government authorizes and consents to all use and manufacture of any invention described in and covered by a United States patent in the performance of this contract or any subcontract at any tier.
- (b) The Contractor agrees to include, and require inclusion of, this clause, suitably modified to identify the parties, in all subcontracts at any tier for supplies or services (including construction, architect-engineer services, and materials, supplies, models, samples, and design or testing services expected to exceed the simplified acquisition threshold); however, omission of this clause from any subcontract, including those at or below the simplified acquisition threshold, does not affect this authorization and consent.

3.7 52.227-2 NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT. (AUG 1996)

- (a) The Contractor shall report to the Contracting Officer, promptly and in reasonable written detail, each notice or claim of patent or copyright infringement based on the performance of this contract of which the Contractor has knowledge.
- (b) In the event of any claim or suit against the Government on account of any alleged patent or copyright infringement arising out of the performance of this contract or out of the use of any supplies furnished or work or services performed under this contract, the Contractor shall furnish to the Government, when requested by the Contracting Officer, all evidence and information in possession of the Contractor pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the Government except where the Contractor has agreed to indemnify the Government.
- (c) The Contractor agrees to include, and require inclusion of, this clause in all subcontracts at any tier for supplies or services (including construction and architect-engineer subcontracts and those for material, supplies, models, samples, or design or testing services) expected to exceed the simplified acquisition threshold at FAR 2.101.

3.8 952.227-9 REFUND OF ROYALTIES. (MAR 1995)

- (a) The contract price includes certain amounts for royalties payable by the Contractor or subcontractors or both, which amounts have been reported to the Contracting Officer.
- (b) The term "royalties" as used in this clause refers to any cost or charges in the nature of royalties, license fees, patent or use of or for the rights in patents and patent applications in connection with performing this contract or any subcontract here-under. The term also includes any costs or charges associated with the access to, use of, or other right pertaining to data that is represented to be proprietary and is related to the performance of this contract or the copyrighted.
- (c) The Contractor shall furnish to the Contracting Officer, before final payment under this contract, a statement of royalties paid or required to be paid in connection with performing this contract and subcontracts hereunder together with the reasons.
- (d) The Contractor will be compensated for royalties reported under paragraph (c) of this clause, only to the extent that such royalties were included in the contract price and are determined by the Contracting Officer to be properly chargeable to the Government and any royalties that are included in the contract price are not, in fact, paid by the Contractor or are determined by the Contracting Officer not to be properly chargeable to the government and allocable to the contract, the contract price shall be reduced. Repayment or credit to the Government shall be made as the Contracting Officer directs. The approval by DOE of any individual payments or royalties shall not prevent the Government from contesting at any time the enforceability, validity, scope of, or title to, any patent or the proprietary nature of data pursuant to which a royalty or other payment is to be or has been made.

(e) If, at any time within 3 years after final payment under this contract, the Contractor for any reason is relieved in whole or in part from the payment of the royalties included in the contract price as adjusted pursuant to paragraph (d) of this clause, the Contractor shall promptly notify the Contracting Officer of that fact and shall reimburse the Government in a corresponding amount.

(f) The substance of this clause, including this paragraph (f), shall be including subcontract in which the amount of royalties reported during negotiation of the subcontract exceeds \$250.

3.9 952.227-11 PATENT RIGHTS-RETENTION BY THE CONTRACTOR (SHORT FORM). (FEB 1995)

(a) Definitions.

(1) "Invention" means any invention or discovery which is or may be patentable or otherwise protectable under title 35 of the United States Code, or any novel variety of plant which is or may be protected under the Plant Variety Protection Act (7 U.S.C. 2321, et seq.).

(2) "Made" when used in relation to any invention means the conception of first actual reduction to practice of such invention.

(3) "Nonprofit organization" means a university or other institution of higher education or an organization of the type described in section 501(c)(3) of the Internal Revenue Code of 1954 (26 U.S.C. 501(c)) and exempt from taxation under section 501(a) of the Internal Revenue Code (26 U.S.C. 501(a)) or any nonprofit scientific or educational organization qualified under a state nonprofit organization statute.

(4) "Practical application" means to manufacture, in the case of a composition or product; to practice, in the case of a process or method; or to operate, in the case of a machine or system; and, in each case, under such conditions as to establish that the invention is being utilized and that its benefits are, to the extent permitted by law or Government regulations, available to the public on reasonable terms.

(5) "Small business firm" means a small business concern as defined at section 2 of Pub. L. 85-536 (15 U.S.C. 632) and implementing regulations of the Administrator of the Small Business Administration. For the purpose of this clause, the size standards for small business concerns involved in Government procurement and subcontracting at 13 CFR 121.3-8 and 13 CFR 121.3-12, respectively, will be used.

(6) "Subject invention" means any invention of the contractor conceived or first actually reduced to practice in the performance of work under this contract, provided that in the case of a variety of plant, the date of determination (as defined in section 41(d) of the Plant Variety Protection Act, 7 U.S.C. 2401(d)) must also occur during the period of contract performance.

(7) "Agency licensing regulations" and "agency regulations concerning the licensing of Government-owned inventions" mean the Department of Energy patent licensing regulations at 10 CFR Part 781.

(b) Allocation of principal rights. The Contractor may retain the entire right, title, and interest throughout the world to each subject invention subject to the provisions of this clause and 35 U.S.C. 203. With respect to any subject invention in which the Contractor retains title, the Federal Government shall have a nonexclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States the subject invention throughout the world.

(c) Invention disclosure, election of title, and filing of patent application by Contractor.

(1) The Contractor will disclose each subject invention to the Department of Energy (DOE) within 2 months after the inventor discloses it in writing to Contractor personnel responsible for patent matters. The disclosure to DOE shall be in the form of a written report and shall identify the contract under which the invention was made and the inventor(s). It shall be sufficiently complete in technical detail to convey a clear understanding to the extent known at the time of the disclosure, of the nature, purpose, operation, and the physical, chemical, biological or electrical characteristics of the invention. The disclosure shall also identify any publication, on sale or public use of the invention and whether a manuscript describing the

invention has been submitted for publication and, if so, whether it has been accepted for publication at the time of disclosure. In addition, after disclosure to the DOE, the Contractor will promptly notify that agency of the acceptance of any manuscript describing the invention for publication or of any on sale or public use planned by the Contractor.

(2) The Contractor will elect in writing whether or not to retain title to any such invention by notifying DOE within 2 years of disclosure to DOE. However, in any case where publication, on sale or public use has initiated the 1-year statutory period wherein valid patent protection can still be obtained in the United States, the period for election of title may be shortened by DOE to a date that is no more than 60 days prior to the end of the statutory period.

(3) The Contractor will file its initial patent application on a subject invention to which it elects to retain title within 1 year after election of title or, if earlier, prior to the end of any statutory period wherein valid patent protection can be obtained in the United States after a publication, on sale, or public use. The Contractor will file patent applications in additional countries or international patent offices within either 10 months of the corresponding initial patent application or 6 months from the date permission is granted by the Commissioner of Patents and Trademarks to file foreign patent applications where such filing has been prohibited by a Secrecy Order.

(4) Requests for extension of the time for disclosure, election, and filing under subparagraphs (c)(1), (2), and (3) of this clause may, at the discretion of the agency, be granted.

(d) Conditions when the Government may obtain title. The Contractor will convey to the Federal agency, upon written request, title to any subject invention--

(1) If the Contractor fails to disclose or elect title to the subject invention within the times specified in paragraph (c) of this clause, or elects not to retain title; provided, that DOE may only request title within 60 days after learning of the failure of the Contractor to disclose or elect within the specified times.

(2) In those countries in which the Contractor fails to file patent applications within the times specified in paragraph (c) of this clause; provided, however, that if the Contractor has filed a patent application in a country after the times specified in paragraph (c) of this clause, but prior to its receipt of the written request of the Federal agency, the Contractor shall continue to retain title in that country.

(3) In any country in which the Contractor decides not to continue the prosecution of any application for, to pay the maintenance fees on, or defend in reexamination or opposition proceeding on, a patent on a subject invention.

(e) Minimum rights to Contractor and protection of the Contractor right to file.

(1) The Contractor will retain a nonexclusive royalty-free license throughout the world in each subject invention to which the Government obtains title, except if the Contractor fails to disclose the invention within the times specified in paragraph (c) of this clause. The Contractor's license extends to its domestic subsidiary and affiliates, if any, within the corporate structure of which the Contractor is a party and includes the right to grant sublicenses of the same scope to the extent the Contractor was legally obligated to do so at the time the contract was awarded. The license is transferable only with the approval of the Federal agency, except when transferred to the successor of that part of the Contractor's business to which the invention pertains.

(2) The Contractor's domestic license may be revoked or modified by DOE to the extent necessary to achieve expeditious practical application of subject invention pursuant to an application for an exclusive license submitted in accordance with applicable provisions at 37 CFR Part 404 and agency licensing regulations. This license will not be revoked in that field of use or the geographical areas in which the Contractor has achieved practical application and continues to make the benefits of the invention reasonably accessible to the public. The license in any foreign country may be revoked or modified at the discretion of DOE to the extent the Contractor, its licensees, or the domestic subsidiaries or affiliates have failed to achieve practical application in that foreign country.

(3) Before revocation or modification of the license, DOE will furnish the Contractor a written notice of its intention to revoke or modify the license, and the Contractor will be allowed 30 days (or such other time as may be authorized by DOE for good cause shown by the Contractor) after the notice to show cause why the license should not be revoked or modified. The Contractor has the right to appeal, in accordance with applicable regulations in 37 CFR Part 404 and agency regulations concerning the licensing of Government owned inventions, any decision concerning the revocation or modification of the license.

(f) Contractor action to protect the Government's interest.

(1) The Contractor agrees to execute or to have executed and promptly deliver to DOE all instruments necessary to (i) establish or confirm the rights the Government has throughout the world in those subject inventions to which the Contractor elects to retain title, and (ii) convey title to DOE when requested under paragraph (d) of this clause and to enable the government to obtain patent protection throughout the world in that subject invention.

(2) The Contractor agrees to require, by written agreement, its employees, other than clerical and nontechnical employees, to disclose promptly in writing to personnel identified as responsible for the administration of patent matters and in a format suggested by the Contractor each subject invention made under contract in order that the Contractor can comply with the disclosure provisions of paragraph (c) of this clause, and to execute all papers necessary to file patent applications on subject inventions and to establish the Government's rights in the subject inventions. This disclosure format should require, as a minimum, the information required by subparagraph (c)(1) of this clause. The Contractor shall instruct such employees, through employee agreements or other suitable educational programs, on the importance of reporting inventions in sufficient time to permit the filing of patent applications prior to U.S. or foreign statutory bars.

(3) The Contractor will notify DOE of any decision not to continue the prosecution of a patent application, pay maintenance fees, or defend in a reexamination or opposition proceeding on a patent, in any country, not less than 30 days before the expiration of the response period required by the relevant patent office.

(4) The Contractor agrees to include, within the specification of any United States patent application and any patent issuing thereon covering a subject invention, the following statement, "This invention was made with Government support under (identify the contract) awarded by the United States Department of Energy. The Government has certain rights in the invention."

(g) Subcontracts. (1) The Contractor will include this clause, suitably modified to identify the parties, in all subcontracts, regardless of tier, for experimental, developmental, or research work to be performed by a small business firm or domestic nonprofit organization. The subcontractor will retain all rights provided for the Contractor in this clause, and the Contractor will not, as part of the consideration for awarding the subcontract, obtain rights in the subcontractor's subject inventions.

(2) The contractor shall include in all other subcontracts, regardless of tier, for experimental, developmental, demonstration, or research work the patent rights clause at 952.227-13.

(3) In the case of subcontracts, at any tier, DOE, subcontractor, and the Contractor agree that the mutual obligations of the parties created by this clause constitute a contract between the subcontractor and DOE with respect to the matters covered by the clause; provided, however, that nothing in this paragraph is intended to confer any jurisdiction under the Contract Disputes Act in connection with proceedings under paragraph (j) of this clause.

(h) Reporting on utilization of subject inventions. The Contractor agrees to submit, on request, periodic reports no more frequently than annually on the utilization of a subject invention or on efforts at obtaining such utilization that are being made by the Contractor or its licensees or assignees. Such reports shall include information regarding the status of development, date of first commercial sale or use, gross royalties received, by the Contractor, and such other data and information as DOE may reasonably specify. The Contractor also agrees to provide additional reports as may be requested by DOE in connection with any march-in proceeding undertaken by that agency in accordance with

paragraph (j) of this clause. As required by 35 U.S.C. 202(c)(5), DOE agrees it will not disclose such information to persons outside the Government without permission of the Contractor.

(i) Preference for United States industry. Notwithstanding any other provision of this clause, the Contractor agrees that neither it nor any assignee will grant to any person the exclusive right to use or sell any subject invention in the United States unless such person agrees that any product embodying the subject invention or produced through the use of the subject invention will be manufactured substantially in the United States. However, in individual cases, the requirement for such an agreement may be waived by DOE upon a showing by the Contractor or its assignee that reasonable but unsuccessful efforts have been made to grant licenses on similar terms to potential licensees that would be likely to manufacture substantially in the United States or that under the circumstances domestic manufacture is not commercially feasible.

(j) March-in rights. The Contractor agrees that, with respect to any subject invention in which it has acquired title, DOE has the right in accordance with the procedures in 37 CFR 401.6 and any supplemental regulations of the agency to require the Contractor, an assignee or exclusive licensee of a subject invention to grant a nonexclusive, partially exclusive, or exclusive license in any field of use to a responsible applicant or applicants, upon terms that are reasonable under the circumstances, and, if the Contractor, assignee, or exclusive licensee refuses such a request, DOE has the right to grant such a license itself if DOE determines that--

(1) Such action is necessary because the Contractor or assignee has not taken, or is not expected to take within a reasonable time, effective steps to achieve practical application of the subject invention in such field of use;

(2) Such action is necessary to alleviate health or safety needs which are not reasonably satisfied by the Contractor, assignee, or their licensees;

(3) Such action is necessary to meet requirements for public use specified by Federal regulations and such requirements are not reasonably satisfied by the Contractor, assignee, or licensees; or

(4) Such action is necessary because the agreement required by paragraph (i) of this clause has not been obtained or waived or because a licensee of the exclusive right to use or sell any subject invention in the United States is in breach of such agreement.

(k) Special provisions for contracts with nonprofit organizations. If the Contractor is a nonprofit organization, it agrees that--

(1) Rights to a subject invention in the United States may not be assigned without the approval of the Federal agency, except where such assignment is made to an organization which has as one of its primary functions the management of inventions; provided, that such assignee will be subject to the same provisions as the Contractor;

(2) The Contractor will share royalties collected on a subject invention with the inventor, including Federal employee co-inventors (when DOE deems it appropriate) when the subject invention is assigned in accordance with 35 U.S.C. 202(e) and 37 CFR 401.10;

(3) The balance of any royalties or income earned by the Contractor with respect to subject inventions, after payment of expenses (including payments to inventors) incidental to the administration of subject inventions will be utilized for the support of scientific research or education; and

(4) It will make efforts that are reasonable under the circumstances to attract licensees of subject inventions that are small business firms, and that it will give a preference to a small business firm when licensing a subject invention if the Contractor determines that the small business firm has a plan or proposal for marketing the invention which, if executed, is equally as likely to bring the invention to practical application as any plans or proposals from applicants that are not small business firms; provided, that the Contractor is also satisfied that the small business firm has the capability and resources to carry out its plan or proposal. The decision whether to give a preference in any specific case will be at the discretion of the contractor. However, the Contractor agrees that the Secretary of Commerce may review the

Contractor's licensing program and decisions regarding small business applicants, and the Contractor will negotiate changes to its licensing policies, procedures, or practices with the Secretary of Commerce when that Secretary's review discloses that the Contractor could take reasonable steps to more effectively implement the requirements of this subparagraph (k)(4).

(l) Communications.

(1) The contractor shall direct any notification, disclosure, or request to DOE provided for in this clause to the DOE patent counsel assisting the DOE contracting activity, with a copy of the communication to the Contracting Officer.

(2) Each exercise of discretion or decision provided for in this clause, except subparagraph (k)(4), is reserved for the DOE Patent Counsel and is not a claim or dispute and is not subject to the Contract Disputes Act of 1978.

(3) Upon request of the DOE Patent Counsel or the contracting officer, the contractor shall provide any or all of the following:

(i) a copy of the patent application, filing date, serial number and title, patent number, and issue date for any subject invention in any country in which the contractor has applied for a patent;

(ii) a report, not more often than annually, summarizing all subject inventions which were disclosed to DOE individually during the reporting period specified; or

(iii) a report, prior to closeout of the contract, listing all subject inventions or stating that there were none.

3.10 952.227-13 PATENT RIGHTS-ACQUISITION BY THE GOVERNMENT. (SEP 1997)

(a) Definitions.

"Invention", as used in this clause, means any invention or discovery which is or may be patentable or otherwise protectable under title 35 of the United States Code or any novel variety of plant that is or may be protectable under the Plant Variety Protection Act (7 U.S.C. 2321, et seq.).

"Practical application", as used in this clause, means to manufacture, in the case of a composition or product; to practice, in the case of a process or method; or to operate, in the case of a machine or system; and, in each case, under such conditions as to establish that the invention is being utilized and that its benefits are, to the extent permitted by law or Government regulations, available to the public on reasonable terms.

"Subject invention", as used in this clause, means any invention of the Contractor conceived or first actually reduced to practice in the course of or under this contract.

"Patent Counsel", as used in this clause, means the Department of Energy Patent Counsel assisting the procuring activity.

"DOE patent waiver regulations", as used in this clause, means the Department of Energy patent waiver regulations at 41 CFR 9-9.109- 6 or successor regulations. See 10 CFR part 784.

"Agency licensing regulations" and "applicable agency licensing regulations", as used in this clause, mean the Department of Energy patent licensing regulations at 10 CFR Part 781.

(b) Allocations of principal rights.

(1) Assignment to the Government. The Contractor agrees to assign to the Government the entire right, title, and interest throughout the world in and to each subject invention, except to the extent that rights are retained by the Contractor under subparagraph (b)(2) and paragraph (d) of this clause.

(2) Greater rights determinations.

(i) The contractor, or an employee-inventor after consultation with the Contractor, may request greater rights than the nonexclusive license and the foreign patent rights provided in paragraph (d) of this clause on identified inventions in accordance with the DOE patent waiver regulations. A request for a determination of whether the Contractor or the employee-inventor is entitled to acquire such greater rights must be submitted to the Patent Counsel with a copy to the Contracting Officer at the time of the first disclosure of the invention pursuant to subparagraph (e)(2) of this clause, or not later than 8 months thereafter, unless a longer period is authorized in writing by the Contracting Officer for good cause shown in writing by the Contractor. Each determination of greater rights under this contract shall be subject to paragraph (c) of this clause, unless otherwise provided in the greater rights determination, and to the reservations and conditions deemed to be appropriate by the Secretary of Energy or designee.

(ii) Within two (2) months after the filing of a patent application, the Contractor shall provide the filing date, serial number and title, a copy of the patent application (including an English-language version if filed in a language other than English), and, promptly upon issuance of a patent, provide the patent number and issue date for any subject invention in any country for which the Contractor has been granted title or the right to file and prosecute on behalf of the United States by the Department of Energy.

(iii) Not less than thirty (30) days before the expiration of the response period for any action required by the Patent and Trademark Office, notify the Patent Counsel of any decision not to continue prosecution of the application.

(iv) Upon request, the Contractor shall furnish the Government an irrevocable power to inspect and make copies of the patent application file.

(c) Minimum rights acquired by the Government.

(1) With respect to each subject invention to which the Department of Energy grants the Contractor principal or exclusive rights, the Contractor agrees as follows:

(i) The Contractor hereby grants to the Government a nonexclusive, nontransferable, irrevocable, paid-up license to practice or have practiced each subject invention throughout the world by or on behalf of the Government of the United States (including any Government agency).

(ii) The Contractor agrees that with respect to any subject invention in which DOE has granted it title, DOE has the right in accordance with the procedures in the DOE patent waiver regulations (10 CFR part 784) to require the Contractor, an assignee, or exclusive licensee of a subject invention to grant a nonexclusive, partially exclusive, or exclusive license in any field of use to a responsible applicant or applicants, upon terms that are reasonable under the circumstances, and if the Contractor, assignee, or exclusive licensee refuses such a request, DOE has the right to grant such a license itself if it determines that--

(A) Such action is necessary because the Contractor or assignee has not taken, or is not expected to take within a reasonable time, effective steps to achieve practical application of the subject invention in such field of use;

(B) Such action is necessary to alleviate health or safety needs which are not reasonably satisfied by the Contractor, assignee, or their licensees;

(C) Such action is necessary to meet requirements for public use specified by Federal regulations and such requirements are not reasonably satisfied by the Contractor, assignee, or licensees; or

(D) Such action is necessary because the agreement required by paragraph (i) of this clause has neither been obtained nor waived or because a licensee of the exclusive right to use or sell any subject invention in the United States is in breach of such agreement.

(iii) The Contractor agrees to submit on request periodic reports no more frequently than annually on the utilization of a subject invention or on efforts at obtaining such utilization of a subject invention or on efforts at obtaining such utilization that are being made by the Contractor or its licensees or assignees. Such reports shall include information regarding the status of development, date of first commercial sale or use, gross royalties received by the Contractor, and such other data and information as DOE may reasonably specify. The Contractor also agrees to provide additional reports as may be requested by DOE in connection with any march-in proceedings undertaken by that agency in accordance with subparagraph (c)(1)(ii) of this clause. To the extent data or information supplied under this section is considered by the Contractor, its licensee, or assignee to be privileged and confidential and is so marked, the Department of Energy agrees that, to the extent permitted by law, it will not disclose such information to persons outside the Government.

(iv) The Contractor agrees, when licensing a subject invention, to arrange to avoid royalty charges on acquisitions involving Government funds, including funds derived through a Military Assistance Program of the Government or otherwise derived through the Government, to refund any amounts received as royalty charges on a subject invention in acquisitions for, or on behalf of, the Government, and to provide for such refund in any instrument transferring rights in the invention to any party.

(v) The Contractor agrees to provide for the Government's paid-up license pursuant to subparagraph (c)(1)(i) of this clause in any instrument transferring rights in a subject invention and to provide for the granting of licenses as required by subparagraph (c)(1)(ii) of this clause, and for the reporting of utilization information as required by subparagraph (c)(1)(iii) of this clause, whenever the instrument transfers principal or exclusive rights in a subject invention. (2) Nothing contained in this paragraph (c) shall be deemed to grant to the Government any rights with respect to any invention other than a subject invention.

(d) Minimum rights to the Contractor.

(1) The Contractor is hereby granted a revocable, nonexclusive, royalty-free license in each patent application filed in any country on a subject invention and any resulting patent in which the Government obtains title, unless the Contractor fails to disclose the subject invention within the times specified in subparagraph (e)(2) of this clause. The Contractor's license extends to its domestic subsidiaries and affiliates, if any, within the corporate structure of which the Contractor is a part and includes the right to grant sublicenses of the same scope to the extent the Contractor was legally obligated to do so at the time the contract was awarded. The license is transferable only with the approval of DOE except when transferred to the successor of that part of the Contractor's business to which the invention pertains.

(2) The Contractor's domestic license may be revoked or modified by DOE to the extent necessary to achieve expeditious practical application of the subject invention pursuant to an application for an exclusive license submitted in accordance with applicable provisions in 37 CFR Part 404 and agency licensing regulations. This license will not be revoked in that field of use or the geographical areas in which the Contractor has achieved practical applications and continues to make the benefits of the invention reasonably accessible to the public. The license in any foreign country may be revoked or modified at the discretion of DOE to the extent the Contractor, its licensees, or its domestic subsidiaries or affiliates have failed to achieve practical application in that foreign country.

(3) Before revocation or modification of the license, DOE will furnish the Contractor a written notice of its intention to revoke or modify the license, and the Contractor will be allowed 30 days (or such other time as may be authorized by DOE for good cause shown by the Contractor) after the notice to show cause why the license should not be revoked or modified. The Contractor has the right to appeal, in accordance with applicable agency licensing regulations and 37 CFR Part 404 concerning the licensing of Government-owned inventions, any decision concerning the revocation or modification of its license.

(4) The Contractor may request the right to acquire patent rights to a subject invention in any foreign country where the Government has elected not to secure such rights, subject to the

conditions in subparagraphs (d)(4)(i) through (d)(4)(vii) of this clause. Such request must be made in writing to the Patent Counsel as part of the disclosure required by subparagraph (e)(2) of this clause, with a copy to the DOE Contracting Officer. DOE approval, if given, will be based on a determination that this would best serve the national interest.

(i) The recipient of such rights, when specifically requested by DOE, and three years after issuance of a foreign patent disclosing the subject invention, shall furnish DOE a report stating:

(A) The commercial use that is being made, or is intended to be made, of said invention, and

(B) The steps taken to bring the invention to the point of practical application or to make the invention available for licensing.

(ii) The Government shall retain at least an irrevocable, nonexclusive, paid-up license to make, use, and sell the invention throughout the world by or on behalf of the Government (including any Government agency) and States and domestic municipal governments, unless the Secretary of Energy or designee determines that it would not be in the public interest to acquire the license for the States and domestic municipal governments.

(iii) If noted elsewhere in this contract as a condition of the grant of an advance waiver of the Government's title to inventions under this contract, or, if no advance waiver was granted but a waiver of the Government's title to an identified invention is granted pursuant to subparagraph (b)(2) of this clause upon a determination by the Secretary of Energy that it is in the Government's best interest, this license shall include the right of the Government to sublicense foreign governments pursuant to any existing or future treaty or agreement with such foreign governments.

(iv) Subject to the rights granted in subparagraphs (d)(1), (2), and (3) of this clause, the Secretary of Energy or designee shall have the right to terminate the foreign patent rights granted in this subparagraph (d)(4) in whole or in part unless the recipient of such rights demonstrates to the satisfaction of the Secretary of Energy or designee that effective steps necessary to accomplish substantial utilization of the invention have been taken or within a reasonable time will be taken.

(v) Subject to the rights granted in subparagraphs (d)(1), (2), and (3) of this clause, the Secretary of Energy or designee shall have the right, commencing four years after foreign patent rights are accorded under this subparagraph (d)(4), to require the granting of a nonexclusive or partially exclusive license to a responsible applicant or applicants, upon terms reasonable under the circumstances, and in appropriate circumstances to terminate said foreign patent rights in whole or in part, following a hearing upon notice thereof to the public, upon a petition by an interested person justifying such hearing:

(A) If the Secretary of Energy or designee determines, upon review of such material as he deems relevant, and after the recipient of such rights or other interested person has had the opportunity to provide such relevant and material information as the Secretary or designee may require, that such foreign patent rights have tended substantially to lessen competition or to result in undue market concentration in any section of the United States in any line of commerce to which the technology relates; or

(B) Unless the recipient of such rights demonstrates to the satisfaction of the Secretary of Energy or designee at such hearing that the recipient has taken effective steps, or within a reasonable time thereafter is expected to take such steps, necessary to accomplish substantial utilization of the invention.

(vi) If the contractor is to file a foreign patent application on a subject invention, the Government agrees, upon written request, to use its best efforts to withhold publication of such invention disclosures for such period of time as specified by Patent

Counsel, but in no event shall the Government or its employees be liable for any publication thereof.

(vii) Subject to the license specified in subparagraphs (d)(1), (2), and (3) of this clause, the contractor or inventor agrees to convey to the Government, upon request, the entire right, title, and interest in any foreign country in which the contractor or inventor fails to have a patent application filed in a timely manner or decides not to continue prosecution or to pay any maintenance fees covering the invention. To avoid forfeiture of the patent application or patent, the contractor or inventor shall, not less than 60 days before the expiration period for any action required by any patent office, notify the Patent Counsel of such failure or decision, and deliver to the Patent Counsel, the executed instruments necessary for the conveyance specified in this paragraph.

(e) Invention identification, disclosures, and reports. (1) The Contractor shall establish and maintain active and effective procedures to assure that subject inventions are promptly identified and disclosed to Contractor personnel responsible for patent matters within 6 months of conception and/or first actual reduction to practice, whichever occurs first in the performance of work under this contract. These procedures shall include the maintenance of laboratory notebooks or equivalent records and other records as are reasonably necessary to document the conception and/or the first actual reduction to practice of subject inventions, and records that show that the procedures for identifying and disclosing the inventions are followed. Upon request, the Contractor shall furnish the Contracting Officer a description of such procedures for evaluation and for determination as to their effectiveness.

(2) The Contractor shall disclose each subject invention to the DOE Patent Counsel with a copy to the Contracting Officer within 2 months after the inventor discloses it in writing to Contractor personnel responsible for patent matters or, if earlier, within 6 months after the Contractor becomes aware that a subject invention has been made, but in any event before any on sale, public use, or publication of such invention known to the Contractor. The disclosure to DOE shall be in the form of a written report and shall identify the contract under which the invention was made and the inventor(s). It shall be sufficiently complete in technical detail to convey a clear understanding, to the extent known at the time of the disclosure, of the nature, purpose, operation, and physical, chemical, biological, or electrical characteristics of the invention. The disclosure shall also identify any publication, on sale, or public use of the invention and whether a manuscript describing the invention has been submitted for publication and, if so, whether it has been accepted for publication at the time of disclosure. In addition, after disclosure to DOE, the Contractor shall promptly notify Patent Counsel of the acceptance of any manuscript describing the invention for publication or of any on sale or public use planned by the Contractor. The report should also include any request for a greater rights determination in accordance with subparagraph (b)(2) of this clause. When an invention is disclosed to DOE under this paragraph, it shall be deemed to have been made in the manner specified in Sections (a)(1) and (a)(2) of 42 U.S.C. 5908, unless the Contractor contends in writing at the time the invention is disclosed that it was not so made.

(3) The Contractor shall furnish the Contracting Officer the following:

(i) Interim reports every 12 months (or such longer period as may be specified by the Contracting Officer) from the date of the contract, listing all subject inventions during that period, and including a statement that all subject inventions have been disclosed (or that there are not such inventions), and that such disclosure has been made in accordance with the procedures required by paragraph (e)(1) of this clause.

(ii) A final report, within 3 months after completion of the contracted work listing all subject inventions or containing a statement that there were no such inventions, and listing all subcontracts at any tier containing a patent rights clause or containing a statement that there were no such subcontracts.

(4) The Contractor agrees to require, by written agreement, its employees, other than clerical and nontechnical employees, to disclose promptly in writing to personnel identified as responsible for the administration of patent matters and in a format suggested by the Contractor each subject invention made under contract in order that the Contractor can comply with the disclosure provisions of paragraph (c) of this clause, and to execute all papers

necessary to file patent applications on subject inventions and to establish the Government's rights in the subject inventions. This disclosure format should require, as a minimum, the information required by subparagraph (e)(2) of this clause.

(5) The Contractor agrees, subject to FAR 27.302(j), that the Government may duplicate and disclose subject invention disclosures and all other reports and papers furnished or required to be furnished pursuant to this clause.

(f) Examination of records relating to inventions.

(1) The Contracting Officer or any authorized representative shall, until 3 years after final payment under this contract, have the right to examine any books (including laboratory notebooks), records, and documents of the Contractor relating to the conception or first actual reduction to practice of inventions in the same field of technology as the work under this contract to determine whether--

(i) Any such inventions are subject inventions;

(ii) The Contractor has established and maintains the procedures required by subparagraphs (e)(1) and (4) of this clause;

(iii) The Contractor and its inventors have complied with the procedures.

(2) If the Contracting Officer learns of an unreported Contractor invention which the Contracting Officer believes may be a subject invention, the Contractor may be required to disclose the invention to DOE for a determination of ownership rights.

(3) Any examination of records under this paragraph will be subject to appropriate conditions to protect the confidentiality of the information involved.

(g) Withholding of payment (NOTE: This paragraph does not apply to subcontracts).

(1) Any time before final payment under this contract, the Contracting Officer may, in the Government's interest, withhold payment until a reserve not exceeding \$50,000 or 5 percent of the amount of this contract, whichever is less, shall have been set aside if, in the Contracting Officer's opinion, the Contractor fails to--

(i) Convey to the Government, using a DOE-approved form, the title and/or rights of the Government in each subject invention as required by this clause.

(ii) Establish, maintain, and follow effective procedures for identifying and disclosing subject inventions pursuant to subparagraph (e)(1) of this clause;

(iii) Disclose any subject invention pursuant to subparagraph (e)(2) of this clause;

(iv) Deliver acceptable interim reports pursuant to subparagraph (e)(3)(i) of this clause; or

(v) Provide the information regarding subcontracts pursuant to subparagraph (h)(4) of this clause. (2) Such reserve or balance shall be withheld until the Contracting Officer has determined that the Contractor has rectified whatever deficiencies exist and has delivered all reports, disclosures, and other information required by this clause. (3) Final payment under this contract shall not be made before the Contractor delivers to the Contracting Officer all disclosures of subject inventions required by subparagraph (e)(2) of this clause, and acceptable final report pursuant to subparagraph (e)(3)(ii) of this clause, and the Patent Counsel has issued a patent clearance certification to the Contracting Officer.

(4) The Contracting Officer may decrease or increase the sums withheld up to the maximum authorized above. No amount shall be withheld under this paragraph while the amount specified by this paragraph is being withheld under other provisions of the contract. The

withholding of any amount or the subsequent payment thereof shall not be construed as a waiver of any Government rights.

(h) Subcontracts.

(1) The contractor shall include the clause at 48 CFR 952.227-11 (suitably modified to identify the parties) in all subcontracts, regardless of tier, for experimental, developmental, demonstration, or research work to be performed by a small business firm or domestic nonprofit organization, except where the work of the subcontract is subject to an Exceptional Circumstances Determination by DOE. In all other subcontracts, regardless of tier, for experimental, developmental, demonstration, or research work, the contractor shall include this clause (suitably modified to identify the parties). The contractor shall not, as part of the consideration for awarding the subcontract, obtain rights in the subcontractor's subject inventions.

(2) In the event of a refusal by a prospective subcontractor to accept such a clause the Contractor--

(i) Shall promptly submit a written notice to the Contracting Officer setting forth the subcontractor's reasons for such refusal and other pertinent information that may expedite disposition of the matter; and

(ii) Shall not proceed with such subcontract without the written authorization of the Contracting Officer.

(3) In the case of subcontracts at any tier, DOE, the subcontractor, and Contractor agree that the mutual obligations of the parties created by this clause constitute a contract between the subcontractor and DOE with respect to those matters covered by this clause.

(4) The Contractor shall promptly notify the Contracting Officer in writing upon the award of any subcontract at any tier containing a patent rights clause by identifying the subcontractor, the applicable patent rights clause, the work to be performed under the subcontract, and the dates of award and estimated completion. Upon request of the Contracting Officer, the Contractor shall furnish a copy of such subcontract, and, no more frequently than annually, a listing of the subcontracts that have been awarded.

(5) The contractor shall identify all subject inventions of the subcontractor of which it acquires knowledge in the performance of this contract and shall notify the Patent Counsel, with a copy to the contracting officer, promptly upon identification of the inventions.

(i) Preference United States industry. Unless provided otherwise, no Contractor that receives title to any subject invention and no assignee of any such Contractor shall grant to any person the exclusive right to use or sell any subject invention in the United States unless such person agrees that any products embodying the subject invention will be manufactured substantially in the United States. However, in individual cases, the requirement may be waived by the Government upon a showing by the Contractor or assignee that reasonable but unsuccessful efforts have been made to grant licenses on similar terms to potential licensees that would be likely to manufacture substantially in the United States or that under the circumstances domestic manufacture is not commercially feasible.

(j) Atomic energy.

(1) No claim for pecuniary award of compensation under the provisions of the Atomic Energy Act of 1954, as amended, shall be asserted with respect to any invention or discovery made or conceived in the course of or under this contract.

(2) Except as otherwise authorized in writing by the Contracting Officer, the Contractor will obtain patent agreements to effectuate the provisions of subparagraph (e)(1) of this clause from all persons who perform any part of the work under this contract, except nontechnical personnel, such as clerical employees and manual laborers.

(k) Background Patents.

(1) Background Patent means a domestic patent covering an invention or discovery which is not a subject invention and which is owned or controlled by the Contractor at any time through the completion of this contract:

(i) Which the contractor, but not the Government, has the right to license to others without obligation to pay royalties thereon, and

(ii) Infringement of which cannot reasonably be avoided upon the practice of any specific process, method, machine, manufacture, or composition of matter (including relatively minor modifications thereof) which is a subject of the research, development, or demonstration work performed under this contract.

(2) The Contractor agrees to and does hereby grant to the Government a royalty-free, nonexclusive license under any background patent for purposes of practicing a subject of this contract by or for the Government in research, development, and demonstration work only.

(3) The Contractor also agrees that upon written application by DOE, it will grant to responsible parties, for purposes of practicing a subject of this contract, nonexclusive licenses under any background patent on terms that are reasonable under the circumstances. If, however, the Contractor believes that exclusive rights are necessary to achieve expeditious commercial development or utilization, then a request may be made to DOE for DOE approval of such licensing by the Contractor.

(4) Notwithstanding subparagraph (k)(3) of this clause, the contractor shall not be obligated to license any background patent if the Contractor demonstrates to the satisfaction of the Secretary of Energy or designee that:

(i) a competitive alternative to the subject matter covered by said background patent is commercially available or readily introducible from one or more other sources; or

(ii) the Contractor or its licensees are supplying the subject matter covered by said background patent in sufficient quantity and at reasonable prices to satisfy market needs, or have taken effective steps or within a reasonable time are expected to take effective steps to so supply the subject matter. l) Publication. It is recognized that during the course of the work under this contract, the Contractor or its employees may from time to time desire to release or publish information regarding scientific or technical developments conceived or first actually reduced to practice in the course of or under this contract. In order that public disclosure of such information will not adversely affect the patent interests of DOE or the Contractor, patent approval for release of publication shall be secured from Patent Counsel prior to any such release or publication.

(m) Forfeiture of rights in unreported subject inventions.

(1) The Contractor shall forfeit and assign to the Government, at the request of the Secretary of Energy or designee, all rights in any subject invention which the Contractor fails to report to Patent Counsel within six months after the time the Contractor:

(i) Files or causes to be filed a United States or foreign patent application thereon; or

(ii) Submits the final report required by subparagraph (e)(2)(ii) of this clause, whichever is later.

(2) However, the Contractor shall not forfeit rights in a subject invention if, within the time specified in subparagraph (m)(1) of this clause, the Contractor:

(i) Prepares a written decision based upon a review of the record that the invention was neither conceived nor first actually reduced to practice in the course of or under the contract and delivers the decision to Patent Counsel, with a copy to the Contracting Officer; or

(ii) Contending that the invention is not a subject invention, the Contractor nevertheless discloses the invention and all facts pertinent to this contention to the Patent Counsel, with a copy to the Contracting Officer; or

(iii) Establishes that the failure to disclose did not result from the Contractor's fault or negligence.

(3) Pending written assignment of the patent application and patents on a subject invention determined by the Secretary of Energy or designee to be forfeited (such determination to be a final decision under the Disputes clause of this contract), the Contractor shall be deemed to hold the invention and the patent applications and patents pertaining thereto in trust for the Government. The forfeiture provision of this paragraph (m) shall be in addition to and shall not supersede other rights and remedies which the Government may have with respect to subject inventions.

3.11 FAR 52.227-14 RIGHTS IN DATA -GENERAL. (JUN 1987) WITH ALTERNATE V (JUN 1987) AS AMENDED BY DEAR 927.409 (JAN 1999)

(a) Definitions.

(1) "Computer databases," as used in this clause, means a collection of data in a form capable of, and for the purpose of, being stored in, processed, and operated on by a computer. The term does not include computer software.

(2) "Computer software," as used in this clause, means (i) computer programs which are data comprising a series of instructions, rules, routines, or statements, regardless of the media in which recorded, that allow or cause a computer to perform a specific operation or series of operations and (ii) data comprising source code listings, design details, algorithms, processes, flow charts, formulae, and related material that would enable the computer program to be produced, created, or compiled. The term does not include computer data bases.

(3) "Data," as used in this clause, means recorded information, regardless of form or the media on which it may be recorded. The term includes technical data and computer software. For the purposes of this clause, the term does not include data incidental to the administration of this contract, such as financial, administrative, cost and pricing, or management information.

(4) "Form, fit, and function data," as used in this clause, means data relating to items, components, or processes that are sufficient to enable physical and functional interchangeability, as well as data identifying source, size, configuration, mating, and attachment characteristics, functional characteristics, and performance requirements; except that for computer software it means data identifying source, functional characteristics, and performance requirements but specifically excludes the source code, algorithm, process, formulae, and flow charts of the software.

(5) "Limited rights data," as used in this clause, means data, other than computer software, developed at private expense that embody trade secrets or are commercial or financial and confidential or privileged. The Government's rights to use, duplicate, or disclose limited rights data are as set forth in the Limited Rights Notice of subparagraph (g)(2) of this section if included in this clause.

(6) "Restricted computer software," as used in this clause, means computer software developed at private expense and that is a trade secret; is commercial or financial and is confidential or privileged; or is published copyrighted computer software, including minor modifications of any such computer software. The Government's rights to use, duplicate, or disclose restricted computer software are as set forth in the Restricted Rights Notice of subparagraph (g)(3) of this section if included in this clause.

(7) "Technical data," as used in this clause, means recorded data, regardless of form or characteristic, that are of a scientific or technical nature. Technical data does not include computer software, but does include manuals and instructional materials and technical data formatted as a computer data base.

(8) "Unlimited rights," as used in this clause, means the rights of the Government to use, disclose, reproduce, prepare derivative works, distribute copies to the public, including by electronic means, and perform publicly and display publicly, in any manner, including by electronic means, and for any purpose whatsoever, and to have or permit others to do so.

(b) Allocation of rights.

(1) Except as provided in paragraph (c) of this clause regarding copyright, the Government shall have unlimited rights in -

(i) Data first produced in the performance of this contract;

(ii) Form, fit, and function data delivered under this contract;

(iii) Data delivered under this contract (except for restricted computer software) that constitute manuals or instructional and training material for installation, operation, or routine maintenance and repair of items, components, or processes delivered or furnished for use under this contract; and

(iv) All other data delivered under this contract unless provided otherwise for limited rights data or restricted computer software in accordance with paragraph (g) of this clause.

(2) The Contractor shall have the right to -

(i) Use, release to others, reproduce, distribute, or publish any data first produced or specifically used by the Contractor in the performance of this contract, unless provided otherwise in paragraph (d) of this clause;

(ii) Protect from unauthorized disclosure and use those data which are limited rights data or restricted computer software to the extent provided in paragraph (g) of this clause;

(iii) Substantiate use of, add or correct limited rights, restricted rights, or copyright notices and to take other appropriate action, in accordance with paragraphs (e) and (f) of this clause; and

(iv) Establish claim to copyright subsisting in data first produced in the performance of this contract to the extent provided in subparagraph (c)(1) of this clause.

(c) Copyright -

(1) Data first produced in the performance of this contract. Unless provided otherwise in paragraph (d) of this clause, the Contractor may establish, without prior approval of the Contracting Officer, claim to copyright subsisting in scientific and technical articles based on or containing data first produced in the performance of this contract and published in academic, technical or professional journals, symposia proceedings or similar works. The prior, express written permission of the Contracting Officer is required to establish claim to copyright subsisting in all other data first produced in the performance of this contract. When claim to copyright is made, the Contractor shall affix the applicable copyright notices of 17 U.S.C. 401 or 402 and acknowledgment of Government sponsorship (including contract number) to the data when such data are delivered to the Government, as well as when the data are published or deposited for registration as a published work in the U.S. Copyright Office. For data other than computer software the Contractor grants to the Government, and others acting on its behalf, a paid nonexclusive, irrevocable worldwide license in such copyrighted data to reproduce, prepare derivative works, distribute copies to the public, and perform publicly and display publicly, by or on behalf of the Government. For computer software, the Contractor grants to the Government and others acting in its behalf, a paid nonexclusive, irrevocable worldwide license in such copyrighted computer software to reproduce, prepare derivative works, and perform publicly and display publicly by or on behalf of the Government.

(2) Data not first produced in the performance of this contract. The Contractor shall not, without prior written permission of the Contracting Officer, incorporate in data delivered under this contract any data not first produced in the performance of this contract and which contains the copyright notice of 17 U.S.C. 401 or 402, unless the Contractor identifies such data and grants to the Government, or acquires on its behalf, a license of the same scope as set forth in subparagraph (c)(1) of this clause; provided, however, that if such data are computer software the Government shall acquire a copyright license as set forth in subparagraph (g)(3) of this clause if included in this contract or as otherwise may be provided in a collateral agreement incorporated in or made part of this contract.

(3) Removal of copyright notices. The Government agrees not to remove any copyright notices placed on data pursuant to this paragraph (c), and to include such notices on all reproductions of the data.

(d) Release, publication and use of data.

(1) The Contractor shall have the right to use, release to others, reproduce, distribute, or publish any data first produced or specifically used by the Contractor in the performance of this contract, except to the extent such data may be subject to the Federal export control or national security laws or regulations, or unless otherwise provided in this paragraph of this clause or expressly set forth in this contract.

(2) The Contractor agrees that to the extent it receives or is given access to data necessary for the performance of this contract which contain restrictive markings, the Contractor shall treat the data in accordance with such markings unless otherwise specifically authorized in writing by the Contracting Officer.

(3) The Contractor agrees not to assert copyright in computer software first produced in the performance of this contract without prior written permission of the DOE Patent Counsel assisting the contracting activity. When such permission is granted, the Patent Counsel shall specify appropriate terms, conditions, and submission requirements to assure utilization, dissemination, and commercialization of the data. The Contractor, when requested, shall promptly deliver to Patent Counsel a duly executed and approved instrument fully confirmatory of all rights to which the Government is entitled.

(e) Unauthorized marking of data.

(1) Notwithstanding any other provisions of this contract concerning inspection or acceptance, if any data delivered under this contract are marked with the notices specified in subparagraph (g)(2) or (g)(3) of this clause and use of such is not authorized by this clause, or if such data bears any other restrictive or limiting markings not authorized by this contract, the Contracting Officer may at any time either return the data to the Contractor, or cancel or ignore the markings. However, the following procedures shall apply prior to canceling or ignoring the markings.

(i) The Contracting Officer shall make written inquiry to the Contractor affording the Contractor 30 days from receipt of the inquiry to provide written justification to substantiate the propriety of the markings;

(ii) If the Contractor fails to respond or fails to provide written justification to substantiate the propriety of the markings within the 30-day period (or a longer time not exceeding 90 days approved in writing by the Contracting Officer for good cause shown), the Government shall have the right to cancel or ignore the markings at any time after said period and the data will no longer be made subject to any disclosure prohibitions.

(iii) If the Contractor provides written justification to substantiate the propriety of the markings within the period set in subdivision (e)(1)(i) of this clause, the Contracting Officer shall consider such written justification and determine whether or not the markings are to be canceled or ignored. If the Contracting Officer determines that the markings are authorized, the Contractor shall be so notified in writing. If the Contracting Officer determines, with concurrence of the head of the contracting activity, that the markings are not authorized, the Contracting Officer shall furnish the Contractor a written determination, which determination shall become the final agency decision regarding the appropriateness of the markings unless the Contractor files suit in a court of competent jurisdiction within 90 days of receipt of the Contracting Officer's decision. The Government shall continue to abide by the markings under this subdivision (e)(1)(iii) until final resolution of the matter either by the Contracting Officer's determination becoming final (in which instance the Government shall thereafter have the right to cancel or ignore the markings at any time and the data will no longer be made subject to any disclosure prohibitions), or by final disposition of the matter by court decision if suit is filed.

(2) The time limits in the procedures set forth in subparagraph (e)(1) of this clause may be modified in accordance with agency regulations implementing the Freedom of Information Act (5 U.S.C. 552) if necessary to respond to a request thereunder.

(3) This paragraph (e) does not apply if this contract is for a major system or for support of a major system by a civilian agency other than NASA and the U.S. Coast Guard agency subject to the provisions of Title III of the Federal Property and Administrative Services Act of 1949.

(4) Except to the extent the Government's action occurs as the result of final disposition of the matter by a court of competent jurisdiction, the Contractor is not precluded by this paragraph (e) from bringing a claim under the Contract Disputes Act, including pursuant to the Disputes clause of this contract, as applicable, that may arise as the result of the Government removing or ignoring authorized markings on data delivered under this contract.

(f) Omitted or incorrect markings.

(1) Data delivered to the Government without either the limited rights or restricted rights notice as authorized by paragraph (g) of this clause, or the copyright notice required by paragraph (c) of this clause, shall be deemed to have been furnished with unlimited rights, and the Government assumes no liability for the disclosure, use, or reproduction of such data. However, to the extent the data has not been disclosed without restriction outside the Government, the Contractor may request, within 6 months (or a longer time approved by the Contracting Officer for good cause shown) after delivery of such data, permission to have notices placed on qualifying data at the Contractor's expense, and the Contracting Officer may agree to do so if the Contractor

(i) Identifies the data to which the omitted notice is to be applied;

(ii) Demonstrates that the omission of the notice was inadvertent;

(iii) Establishes that the use of the proposed notice is authorized; and

(iv) Acknowledges that the Government has no liability with respect to the disclosure, use, or reproduction of any such data made prior to the addition of the notice or resulting from the omission of the notice.

(2) The Contracting Officer may also (i) permit correction at the Contractor's expense of incorrect notices if the Contractor identifies the data on which correction of the notice is to be made, and demonstrates that the correct notice is authorized, or (ii) correct any incorrect notices.

(g) Protection of limited rights data and restricted computer software.

(1) When data other than that listed in subdivisions (b)(1)(i), (ii), and (iii) of this clause are specified to be delivered under this contract and qualify as either limited rights data or restricted computer software, if the Contractor desires to continue protection of such data, the Contractor shall withhold such data and not furnish them to the Government under this contract. As a condition to this withholding, the Contractor shall identify the data being withheld and furnish form, fit, and function data in lieu thereof. Limited rights data that are formatted as a computer data base for delivery to the Government are to be treated as limited rights data and not restricted computer software.

(2) (Reserved)

(3) (Reserved)

(h) Subcontracting. The Contractor has the responsibility to obtain from its subcontractors all data and rights therein necessary to fulfill the Contractor's obligations to the Government under this contract. If a subcontractor refuses to accept terms affording the Government such rights, the Contractor shall promptly bring such refusal to the attention of the Contracting Officer and not proceed with subcontract award without further authorization.

(i) Relationship to patents. Nothing contained in this clause shall imply a license to the Government under any patent or be construed as affecting the scope of any license or other right otherwise granted to the Government.

(j) The Contractor agrees, except as may be otherwise specified in this contract for specific data items listed as not subject to this paragraph, that the Contracting Officer or an authorized representative may, up to three years after acceptance of all items to be delivered under this contract, inspect at the Contractor's facility any data withheld pursuant to paragraph (g)(1) of this clause, for purposes of verifying the Contractor's assertion pertaining to the limited rights or restricted rights status of the data or for evaluating work performance. Where

the Contractor whose data are to be inspected demonstrates to the Contracting Officer that there would be a possible conflict of interest if the inspection were made by a particular representative, the Contracting Officer shall designate an alternate inspector.

3.12 FAR 52.227-14 RIGHTS IN DATA GENERAL. (JUN 1987) ALTERNATE II (JUN 1987)

[Insert the following paragraph (g)(2) if it is necessary to obtain the delivery of limited rights data:]

(2) Notwithstanding subparagraph (g)(1) of this clause, the contract may identify and specify the delivery of limited rights data, or the Contracting Officer may require by written request the delivery of limited rights data that has been withheld or would otherwise be withholdable. If delivery of such data is so required, the Contractor may affix the following "Limited Rights Notice" to the data and the Government will thereafter treat the data, subject to the provisions of paragraphs (e) and (f) of this clause, in accordance with such Notice:

LIMITED RIGHTS NOTICE (JUN 1987)

(a) These data are submitted with limited rights under Government Contract No. [TBD] (and subcontract [TBD], if appropriate). These data may be reproduced and used by the Government with the express limitation that they will not, without written permission of the Contractor, be used for purposes of manufacture nor disclosed outside the Government; except that the Government may disclose these data outside the Government for the following purposes, if any; provided that the Government makes such disclosure subject to prohibition against further use and disclosure: [Agencies may list additional purposes as set forth in 27.404(d)(1) or if none, so state.]

(b) This Notice shall be marked on any reproduction of these data, in whole or in part.

(End of notice)

3.13 FAR 52.227-14 RIGHTS IN DATA GENERAL. (JUN 1987) ALTERNATE III (JUN 1987)

[Insert the following paragraph (g)(3) if it is necessary to obtain the delivery of restricted computer software:]

(3)(i) Notwithstanding subparagraph (g)(1) of this clause, the contract may identify and specify the delivery of restricted computer software, or the Contracting Officer may require by written request the delivery of restricted computer software that has been withheld or would otherwise be withholdable. If delivery of such computer software is so required, the Contractor may affix the following "Restricted Rights Notice" to the computer software and the Government will thereafter treat the computer software, subject to paragraphs (e) and (f) of this clause, in accordance with the Notice

RESTRICTED RIGHTS NOTICE (JUN 1987)

(a) This computer software is submitted with restricted rights under Government Contract No. [TBD] (and subcontract [TBD], if appropriate). It may not be used, reproduced, or disclosed by the Government except as provided in paragraph (b) of this Notice or as otherwise expressly stated in the contract.

(b) This computer software may be

(1) Used or copied for use in or with the computer or computers for which it was acquired, including use at any Government installation to which such computer or computers may be transferred;

(2) Used or copied for use in a backup computer if any computer for which it was acquired is inoperative;

(3) Reproduced for safekeeping (archives) or backup purposes;

(4) Modified, adapted, or combined with other computer software, provided that the modified, combined, or adapted portions of the derivative software incorporating restricted computer software are made subject to the same restricted rights;

(5) Disclosed to and reproduced for use by support service Contractors in accordance with subparagraphs (b)(1) through (4) of this clause, provided the Government makes such disclosure or reproduction subject to these restricted rights; and

(6) Used or copied for use in or transferred to a replacement computer.

(c) Notwithstanding the foregoing, if this computer software is published copyrighted computer software, it is licensed to the Government, without disclosure prohibitions, with the minimum rights set forth in paragraph (b) of this clause.

(d) Any other rights or limitations regarding the use, duplication, or disclosure of this computer software are to be expressly stated in, or incorporated in, the contract.

(e) This Notice shall be marked on any reproduction of this computer software, in whole or in part.

3.14 FAR 52.227-14 RIGHTS IN DATA GENERAL. (JUN 1987) ALTERNATE IV (JUN 1987)

[Substitute paragraph (c)(1) in contracts for basic and applied research to be performed solely by universities and colleges.]

(c) Copyright.

(1) Data first produced in the performance of the contract. Except as otherwise specifically provided in this contract, the Contractor may establish claim to copyright subsisting in any data first produced in the performance of this contract. When claim to copyright is made, the Contractor shall affix the applicable copyright notice of 17 U.S.C. 401 or 402 and acknowledgment of Government sponsorship (including contract number) to the data when such data are delivered to the Government, as well as when the data are published or deposited for registration as a published work in the U.S. Copyright Office. For data other than computer software, the Contractor grants to the Government, and others acting on its behalf, a paid nonexclusive, irrevocable, worldwide license for all such data to reproduce, prepare derivative works, distribute copies to the public, and perform publicly and display publicly, by or on behalf of the Government. For computer software, the Contractor grants to the Government and others acting on its behalf, a paid up, nonexclusive, irrevocable worldwide license for all such computer software to reproduce, prepare derivative works, and perform publicly and display publicly, by or on behalf of the Government.

3.15 52.227-16 ADDITIONAL DATA REQUIREMENTS. (JUN 1987)

(a) In addition to the data (as defined in the clause at 52.227-14, Rights in Data - General clause or other equivalent included in this contract) specified elsewhere in this contract to be delivered, the Contracting Officer may, at any time during contract performance or within a period of 3 years after acceptance of all items to be delivered under this contract, order any data first produced or specifically used in the performance of this contract.

(b) The Rights in Data - General clause or other equivalent included in this contract is applicable to all data ordered under this Additional Data Requirements clause. Nothing contained in this clause shall require the Contractor to deliver any data the withholding of which is authorized by the Rights in Data - General or other equivalent clause of this contract, or data which are specifically identified in this contract as not subject to this clause.

(c) When data are to be delivered under this clause, the Contractor will be compensated for converting the data into the prescribed form, for reproduction, and for delivery.

(d) The Contracting Officer may release the Contractor from the requirements of this clause for specifically identified data items at any time during the 3-year period set forth in paragraph (a) of this clause.

3.16 52.227-23 RIGHTS TO PROPOSAL DATA (TECHNICAL) (JUN 1987)

Except for data contained on pages [TBD], it is agreed that as a condition of award of this contract, and notwithstanding the conditions of any notice appearing thereon, the Government shall have unlimited rights (as defined in the "Rights in Data - General" clause contained in this contract) in and to the technical data contained in the proposal dated [TBD], upon which this contract is based.

SECTION IV -- LIST OF ATTACHMENTS

4.1 LIST OF ATTACHMENTS (JAN 1999)

Attachment A -- Statement of Project Objectives

Attachment B -- Federal Assistance Reporting Checklist

Attachment C -- Budget Page(s)

Attachment D -- Recipient Acquired Property

Attachment E -- Federally Owned Property -- Government Furnished

4.2 ATTACHMENT A -- STATEMENT OF PROJECT OBJECTIVES - UNDEFINED (AUG 1999)

The Statement of Project Objectives will be inserted on this page upon award.

The applicant must prepare the Statement of Project Objectives and include it as an Appendix to Volume II - Technical Application. Instructions for preparation of this document can be found in Section VI.

4.3 ATTACHMENT B -- FEDERAL ASSISTANCE REPORTING CHECKLIST (JAN 1999)

NETL F 540.3-1#
(12/1999) OPI=PS10
(Previous Editions Obsolete)

FEDERAL ASSISTANCE REPORTING CHECKLIST

1. Awardee: TBD	2. Identification Number: Program Solicitation DE-PS26-00NT40777																																																																		
3. Report Submission Address: <i>The requested quantity of all required report deliverables shall be submitted to the following address:</i> NETL AAD DOCUMENT CONTROL BLDG. 921 U.S. DEPARTMENT OF ENERGY NATIONAL ENERGY TECHNOLOGY LABORATORY P.O. BOX 10940 PITTSBURGH, PA 15236-0940																																																																			
4. PLANNING AND REPORTING REQUIREMENTS:																																																																			
A. PROGRAM/PROJECT MANAGEMENT <input checked="" type="checkbox"/> Federal Assistance Milestone Plan <input checked="" type="checkbox"/> Milestone Log <input type="checkbox"/> Federal Assistance Management Summary Report <input checked="" type="checkbox"/> Federal Assistance Program/Project Status Report <input checked="" type="checkbox"/> Financial Status Report <input type="checkbox"/> Federal Cash Transaction Report B. TECHNICAL (One paper copy and one PDF electronic file copy) <input checked="" type="checkbox"/> Technical Progress Report <input checked="" type="checkbox"/> Topical Report <input checked="" type="checkbox"/> Final Report C. ENVIRONMENTAL <input checked="" type="checkbox"/> Hazardous Substance Plan <input checked="" type="checkbox"/> Hazardous Waste Report <input type="checkbox"/> Environmental Compliance Plan <input type="checkbox"/> Environmental Monitoring Plan <input type="checkbox"/> Environmental Status Report D. PROPERTY <input checked="" type="checkbox"/> Annual Report of Property in the Custody of Contractors <input type="checkbox"/> High Risk Property Report <input checked="" type="checkbox"/> Report of Termination or Completion Inventory E. EXCEPTION <input type="checkbox"/> Conference Record <input checked="" type="checkbox"/> Hot Line Report <input checked="" type="checkbox"/> Journal Articles/Conference Papers and Proceedings <input type="checkbox"/> Software <input type="checkbox"/> Other _____	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">FORM NO.</th> <th style="text-align: center;">FREQ.</th> <th style="text-align: center;">NUMBER OF COPIES</th> </tr> </thead> <tbody> <tr> <td>DOE F 4600.3</td> <td style="text-align: center;">Q</td> <td style="text-align: center;">3</td> </tr> <tr> <td>DOE F 4600.3A</td> <td style="text-align: center;">Q</td> <td style="text-align: center;">3</td> </tr> <tr> <td>DOE F 4600.5</td> <td></td> <td></td> </tr> <tr> <td>DOE F 4600.6</td> <td style="text-align: center;">Q</td> <td style="text-align: center;">3</td> </tr> <tr> <td>SF-269 or SF-269A</td> <td style="text-align: center;">Q</td> <td style="text-align: center;">3</td> </tr> <tr> <td>SF-272</td> <td></td> <td></td> </tr> <tr> <td>None</td> <td style="text-align: center;">S</td> <td style="text-align: center;">2</td> </tr> <tr> <td>None</td> <td style="text-align: center;">A</td> <td style="text-align: center;">2</td> </tr> <tr> <td>None</td> <td style="text-align: center;">F</td> <td style="text-align: center;">2</td> </tr> <tr> <td>None</td> <td></td> <td></td> </tr> <tr> <td>None</td> <td style="text-align: center;">O</td> <td style="text-align: center;">3</td> </tr> <tr> <td>None</td> <td style="text-align: center;">F</td> <td style="text-align: center;">3</td> </tr> <tr> <td>None</td> <td></td> <td></td> </tr> <tr> <td>None</td> <td></td> <td></td> </tr> <tr> <td>None</td> <td></td> <td></td> </tr> <tr> <td>F 580.1-8</td> <td style="text-align: center;">A</td> <td style="text-align: center;">1</td> </tr> <tr> <td>F 4440.5</td> <td></td> <td></td> </tr> <tr> <td>SF-1428 or SF-120</td> <td style="text-align: center;">FC</td> <td style="text-align: center;">1</td> </tr> <tr> <td>None</td> <td></td> <td></td> </tr> <tr> <td>None</td> <td style="text-align: center;">A</td> <td style="text-align: center;">2</td> </tr> <tr> <td>None</td> <td style="text-align: center;">A</td> <td style="text-align: center;">2</td> </tr> </tbody> </table>	FORM NO.	FREQ.	NUMBER OF COPIES	DOE F 4600.3	Q	3	DOE F 4600.3A	Q	3	DOE F 4600.5			DOE F 4600.6	Q	3	SF-269 or SF-269A	Q	3	SF-272			None	S	2	None	A	2	None	F	2	None			None	O	3	None	F	3	None			None			None			F 580.1-8	A	1	F 4440.5			SF-1428 or SF-120	FC	1	None			None	A	2	None	A	2
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5. FREQUENCY CODES AND DUE DATES: A - As required; for due date of Hot Line Report, Property Reports, and all other reports, see attached text. C - Federal Assistance change/revision, within 15 calendar days after event. F - Final; within ninety (90) calendar days after the project period ends. FC - Final (End of Effort - No Draft); end of effort. M - Monthly; within twenty-five (25) calendar days after end of the report period. O - Once after award; within thirty (30) calendar days after award. Q - Quarterly; within thirty (30) calendar days after end of the calendar quarter or portion thereof. S - Semiannually; within thirty (30) calendar days after end of program half-year. Y - Yearly; 90 calendar days after the end of calendar year.																																																																			
6. SPECIAL INSTRUCTIONS: The forms identified in the checklist are available at http://www.netl.doe.gov/business/forms/forms.html . Alternate formats are acceptable provided the contents remain consistent with the form. All technical reports submitted to the DOE must be accompanied by a completed and signed <u>NETL F 2050.4</u> addressing patent information.																																																																			

4.5 GENERAL INSTRUCTIONS FOR THE PREPARATION AND SUBMISSION OF REPORTS (MAY 1999)

The Recipient shall prepare and submit (postage prepaid) the plans and reports indicated on the "Federal Assistance Reporting Checklist" to the addressee identified on the checklist. The level of detail the Recipient provides in the plans and reports shall be commensurate with the scope and complexity of the effort and shall be as delineated in the guidelines and instructions contained herein. The prime Recipient shall be responsible for acquiring data from any contractors or subrecipients to ensure that data submitted are compatible with the data elements which prime Recipients are required to submit to DOE.

4.6 FEDERAL ASSISTANCE MILESTONE PLAN (DOE F 4600.3) AND MILESTONE LOG (DOE F 4600.3A) (MAY 1999)

The milestone plan is used as a planning tool, establishing the time schedule for accomplishing the planned work. Usually, it is accompanied by the DOE F 4600.3A, "Milestone Log." The Milestone Plan portrays the major milestones of the project in bar chart format. The purpose of the plan is to establish the Recipient's time schedule for accomplishing planned events and milestones. It covers the life of the project and is to be organized by major project activities, such as those performed at work breakdown structure Level 2. Intermediate events and critical milestones are further identified in an attached "milestone log" and include the identification number, descriptive name of the event or milestone, and the scheduled date of completion.

4.7 FEDERAL ASSISTANCE MANAGEMENT SUMMARY REPORT (DOE F 4600.5) (MAY 1999)

This report is a graphic presentation of costs and milestone status that provides rapid visual analysis and trend forecasting. The funding levels should represent all available resources. The Recipient provides summary cumulative cost and activity data for each reporting period. (Refer to the back of the form for more detailed instructions.)

4.8 FEDERAL ASSISTANCE PROGRAM/PROJECT STATUS REPORT (FORM 4600.6) (MAY 1999)

This report is a concise narrative describing the current status of the effort. The report allows Recipients to communicate developments, achievements, changes and problems. The award Recipient enters a brief narrative discussion of the following topics: approach changes; performance variances, accomplishments, or problems; open times; and status assessment and forecast. Each of these topics is addressed, as appropriate, for a given reporting period and the report is submitted periodically, as required, during the life of the project.

4.9 FINANCIAL STATUS REPORT (STANDARD FORM 269 OR 269A) (MAY 1999)

This report is used for the Recipient to provide regular periodic accounting of project funds expended. The accounting may be on either a cash or accrual basis. Actual total expenditures and obligations incurred, but not paid, are reported for each reporting period for each major activity. They should correlate with those identified on the "Federal Assistance Milestone Plan" when the "Federal Assistance Milestone Plan" is required. Provision is made to identify the Federal and non-Federal share of project outlays for each identified activity.

4.10 REPORT OF FEDERAL CASH TRANSACTIONS (STANDARD FORM 272) (MAY 1999)

This report is used by DOE to monitor cash advanced to Recipients and to obtain disbursement information. The content of the report is prescribed in 10 CFR 600.152 for Institutions of higher Education, Hospitals, Other Non-Profit Organizations and Commercial Organizations or 10 CFR 600.241 for States and Local Governments.

4.11 TECHNICAL REPORTS (DEC 1999)

CAUTION: Technical reports SHALL NOT include limited rights data (such as restricted, proprietary or patentable information). Limited Rights Data shall be submitted in a separate proprietary appendix to the technical report. This appendix SHALL NOT be submitted in an electronic format but rather submitted in ONE ORIGINAL AND THREE (3) PAPER COPIES along with the paper version of the sanitized technical report deliverable. The appendix shall be referenced in, but not included in, the sanitized technical report deliverable under the contract. In accordance with FAR 52.227-14, Rights in Data-General, the appendix must be appropriately marked and identified.

All TECHNICAL REPORTS submitted to the DOE MUST be accompanied by a completed and signed NETL F 2050.4, addressing patent information.

4.12 TECHNICAL PROGRESS REPORT (ANNUAL, QUARTERLY, AND SEMI-ANNUAL) (MAY 1999)

The body of the report should contain a full account of progress, problems encountered, plans for the next reporting period, and an assessment of the prospects for future progress.

The Technical Progress Report should include sufficient detail to allow the work to be reproduced by others. Results and reduced data shall be presented together with a discussion of the relevance of the findings. When experimental systems and/or procedures are being utilized for the first time, they shall be described in detail. This description shall contain detailed information on equipment and procedures utilized, as well as providing a rationale for their use. All data reduction and transformation methods shall be fully documented. For every fourth calendar quarter for quarterly reports or every second half year for semi-annual reports, the report should be expanded to provide for detailed information on the results of the past year, problems encountered, significant accomplishments, listing of publications, presentations, and approaches to be taken the following year.

Informational items in technical progress reports shall include:

Experimental Apparatus -- A comprehensive description, including dimensioned drawings or sketches, of the apparatus and associated diagnostic measurement equipment employed to perform the experimental research.

Experimental and Operating Data -- All experimental data acquired during the course of research including detailed characterization of the sample materials subjected to experimentation.

Data Reduction -- A complete description of the methods employed to transform raw measured data into a form usable for interpretation along with any assumptions or restrictions inherent in the method and the resultant reduced data.

Hypothesis and Conclusions -- Logic for drawing conclusions or developing hypotheses shall be clearly stated along with applicable assumptions or restrictions.

4.13 FINAL TECHNICAL REPORT (MAY 1999)

The Final Report shall document and summarize all work performed during the award period in a comprehensive manner. It shall also present findings and/or conclusions produced as a consequence of this work. This report shall not merely be a compilation of information contained in subsequent quarterly, or other technical reports, but shall present that information in an integrated fashion, and shall be augmented with findings and conclusions drawn from the research as a whole.

The Recipient shall deliver a draft copy of the final report thirty (30) days after completion of the project period. The Government shall be allowed thirty (30) days to review the draft copy and to notify the Recipient, in writing, of approval or recommended changes. If the Government does not approve or recommend changes within thirty (30) days of receipt of the draft copy, the report shall be deemed approved. The approved final report is due ninety (90) days after completion of the project period.

4.14 TOPICAL REPORT (MAY 1999)

These reports usually provide a comprehensive statement of the technical results of the work performed for a specific task or subtask of the Statement of Project Objectives, or detail significant new scientific or technical advances. If required, DOE shall review and approve the report outline prior to submission of the report.

4.15 SOFTWARE (MAY 1999)

Major pieces of computer software developed largely as a result of the performance of this effort shall be delivered to the Government shortly after development or at the completion of the effort, as appropriate. The software shall be delivered together with sufficient documentation concerning its development and use to permit future use by others, and to provide a firm basis for allowing modifications to be made in any subsequent development efforts. Unless otherwise specified, software shall be written in a standard computer language such as Fortran 77, operate on the VAS VMS version 5.1 operating system or an IBM PC-compatible personal computer running MS/DOS, and should not incorporate or be dependent on the use of proprietary software.

4.16 GUIDELINES FOR ORGANIZATION OF TECHNICAL REPORTS (DEC 1999)

The following sections should be included (as appropriate) in technical reports in the sequence shown. Any section denoted by an asterisk is required in all technical reports.

TITLE PAGE* - The Title Page of the report itself must contain the following information in the following sequence:

Report Title
Type of Report (Quarterly, Semi-Annual, Annual, Topical, Final)
Reporting Period Start Date
Reporting Period End Date
Principal Author(s)
Date Report was Issued (Month [spelled out] and Year [4 digits])
DOE Award Number (e.g., DE-FG26-00NT12345) and if appropriate, task number
Name and Address of Submitting Organization (This section should also contain the name and address of significant subcontractors or subrecipients who participated in the production of the report.)

DISCLAIMER* -- The Disclaimer must follow the title page, and must contain the following paragraph:

"This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof."

ABSTRACT* - should be a brief, concise summary of the report.

TABLE OF CONTENTS*

LIST(S) OF GRAPHICAL MATERIALS

INTRODUCTION

EXECUTIVE SUMMARY - this should be a well organized summary that highlights the important accomplishments of the research during the reporting period. It should be no less than one page and no more than two pages in length, and should be single spaced. This summary must be more comprehensive than the traditional "abstract."

EXPERIMENTAL* - this should describe, or reference all experimental methods being used for the research. It should also provide detail about materials and equipment being used. Standard methods can be referenced to the appropriate literature, where details can be obtained. Equipment should be described only if it is not standard, or if information is not available thru the literature or other reference publications.

RESULTS AND DISCUSSION* - It is extremely important that this section includes enough relevant data, especially statistical data, to allow the project manager to justify the conclusions. With the relevant data, explain how the data was interpreted and how it relates to the original purpose of the research. Be concise in the discussion on how this research effort solved or contributed to solving the original problem.

CONCLUSION* - The conclusion should not simply reiterate what was already included in the "Results and Discussion" section. It should, however, summarize what has already been presented, and include any logical implications of how the successes are relevant to technology development in the future. This is extremely important, since "relevancy" continues to be a criteria of the program.

REFERENCES*
BIBLIOGRAPHY
LIST OF ACRONYMS AND ABBREVIATIONS
APPENDICES (IF NECESSARY)

Company Names and Logos -- Except as indicated above, company names, logos, or similar material should not be incorporated into reports.

Copyrighted Material -- Copyrighted material should not be submitted as part of a report unless written authorization to use such material is received from the copyright owner and is submitted to DOE with the report.

Measurement Units -- All reports to be delivered under this instrument shall use the SI Metric System of Units as the primary units of measure. When reporting units in all reports, primary SI units shall be followed by their U.S. Customary Equivalents in parentheses ().

The Recipient shall insert the text of this clause, including this paragraph, in all subcontracts under this award.

Note: SI is an abbreviation for "Le Systeme International d'Unites."

4.17 ELECTRONIC MEDIA STANDARD FOR PREPARATION OF TECHNICAL REPORTS (DEC 1999)

FILE FORMAT

Production of high-quality, electronic documents is dependent on the quality of the input that is provided. Thus, the Recipient shall submit one good quality paper copy using either permanent or alkaline paper plus an electronic version of each technical report.

ELECTRONIC REPORTS SHALL BE SUBMITTED IN THE ADOBE ACROBAT PORTABLE DOCUMENT FORMAT (PDF). ELECTRONIC REPORTS SUBMITTED IN A FORMAT OTHER THAN ADOBE WILL BE RETURNED AND THE REPORT CONSIDERED DELINQUENT.

Each report shall be an integrated file that contains all text, tables, diagrams, photographs, schematics, graphs, and charts.

SUBMISSION FORMAT

The electronic file(s) shall be submitted via diskette or CD-ROM. Diskettes or CD-ROMs must be labeled as follows:

DOE Award Number
Type/Frequency of Report(s)
Reporting Period (if applicable)
Name of submitting organization
Name, phone number and fax number of preparer

Diskettes -- Diskettes must be 3.5" double-sided, high-density (1.4 M Byte capacity). If file compression software is used to transmit a PDF file spanning more than one diskette, PKZIP from PKWare, Inc., is the required compression software. State the number of diskettes in the set (e.g., 1/3)

CD-ROM -- The electronic file(s) may be submitted on an ISO9660-format CD-ROM.

FILE NAMING

In naming the electronic file, the Recipient shall use the standard eight-character naming convention for the main file name, and the three character extension applicable to the software use, e.g., .pdf for Adobe.

For the main file name, the first five characters are the last five digits from the award number; e.g., for Award Number DE-FG26-00NT12345, the first five characters are 12345.

The next character represents the technical report and will always be designated as "R".

The remaining two characters indicate the chronological number of the particular type of report; e.g., Quarterly Technical Progress Reports for a 5-year award are numbered R01 through R20. Thus, the main file name for the sixth Quarterly Technical Progress Report under Award No. DE-FG26-00NT12345 would be 12345R06.PDF. If monthly, quarterly, annual, and a final technical report are required, the numbers would run from R01 through R86 (60 monthly reports, 20 quarterly reports, 5 annual reports, and 1 final report).

4.18 ENVIRONMENTAL (DEC 1999)

In response to the requirements of the National Environmental Policy Act of 1969 (NEPA) and other related environmental statutes, the National Energy Technology Laboratory (NETL) requires the submission of various documents that assess the environmental aspects and projected impacts of all of its proposed actions. These documents may include the following: (1) Hazardous Substance Plan, (2) Hazardous Waste Report, (3) Environmental Compliance Plan, (4) Environmental Monitoring Plan, and (5) Environmental Status Reports.

The environmental information provided in these documents will enable NETL to fulfill its responsibilities under NEPA (additional information about the requirements of the National Environmental Policy Act can be found in the DOE NEPA Compliance Guide and 10 CFR 1021) and to monitor the Recipient's compliance with other environmental regulations. The implementation of any task associated with a proposed action will be dependent upon DOE completing necessary NEPA documentation. Therefore, to minimize the risk of project delays, it is imperative that these reports be submitted in a timely manner.

The information contained herein specifies the basic environmental requirements for this award, but it is not to be interpreted as containing all necessary information for any given project. Likewise, certain aspects of the requirements may not be applicable. Accordingly, the level of information provided should be sufficient for DOE to assess the environmental implications of the proposed action.

4.19 HAZARDOUS SUBSTANCE PLAN (MAY 1999)

The Recipient shall submit a Hazardous Substance Plan not later than thirty (30) days after initial award. The Plan shall specifically identify each Hazardous Substance (as defined under 40 CFR 261, Subpart D, entitled Lists of Hazardous Wastes) anticipated to be purchased, utilized or generated in the performance of this award. For each such Hazardous Substance identified, the Plan shall specifically provide the following information:

- Description of Substance/Chemical
- EPA Hazardous Waste Number
- EPA Hazard Code
- Anticipated Quantity to be purchased, utilized or generated
- Anticipated Hazardous Waste Transporter
- Anticipated Hazardous Waste Disposal Facility Contractor and Location (City/Municipality, State)
- Anticipated Treatment Method

4.20 HAZARDOUS WASTE REPORT (MAY 1999)

The Recipient shall submit a Hazardous Waste Report at the completion of award performance. The Report shall specifically identify each Hazardous Waste (as defined under 40 CFR 261, Subpart D, entitled Lists of Hazardous Wastes) actually utilized, or generated in the performance of this award. For each such Hazardous Waste identified, the Report shall specifically provide the following information:

- Description of Substance/Chemical
- EPA Hazardous Waste Number
- EPA Hazard Code
- Actual Quantity Disposed
- Actual Hazardous Waste Transporter
- Actual Hazardous Waste Disposal Facility Contractor and Location (City/Municipality, State)
- Actual Disposal Date
- Actual Treatment Method

The Hazardous Waste Report is intended as a final reconciliation of anticipated versus actual Hazardous Substances purchased, utilized, or generated in the performance of this award.

4.21 PROPERTY REPORTS (DEC 1999)

The NETL Property Handbook entitled "Management of Government Property in the Possession of Contractors," contains forms, instructions, and suggested formats for submission of property reports. This handbook can be found at <http://www.netl.doe.gov/business/index.html>.

4.22 ANNUAL REPORT OF PROPERTY IN THE CUSTODY OF CONTRACTORS (NETL F 580.1-8) (DEC 1999)

This report includes **ALL** Government-owned and Government-furnished property and materials for which the Recipient is accountable to the Government. This report shall also include Government Property at subcontractor's plants and alternate locations. This report is submitted on NETL F 580.1-8 for the period ending September 30 and is due by October 15.

4.23 REPORT OF TERMINATION OR COMPLETION INVENTORY (SF-1428 AND SF-120) (MAY 1999)

This report submitted on the SF-1428 and SF-120 is due immediately upon completion or termination of the award. The Recipient is required to perform and cause each subcontractor to perform a physical inventory, adequate for disposal purposes, of all Government property applicable to the award.

4.24 HOT LINE REPORT (DEC 1999)

The "Hot Line Report" may be used to report a major breakthrough in research, development, or design; an event causing a significant schedule slippage or cost growth; an environmental, safety and health violation; achievement of or failure to achieve an important technical objective; or any requirement for quickly documented direction or redirection. The report shall be submitted by the most rapid means available, usually electronic, and should confirm telephone conversations with DOE representatives. Identification as a "Hot Line Report" serves notice at each link in the delivery chain that expedition in handling is required. Unless otherwise agreed by the parties involved, DOE is expected to take action and respond in a similarly timely manner. The report should include:

1. Recipient's name and address;
2. Award title and number;
3. Date;
4. Brief statement of problem or event;
5. Anticipated impacts; and
6. Corrective action taken or recommended.

Hot line reports shall document the incidents listed below:

1. Any single fatality or injuries requiring hospitalization of five or more individuals is to be immediately reported.
2. Any significant environmental permit violation is to be reported as soon as possible, but within 24 hours of the discovery of the incident.
3. Other incidents that have the potential for high visibility in the media are to be reported as quickly as possible, but within 24 hours following discovery.
4. Any failure resulting in damage to Government-owned equipment in excess of \$50,000 is to be reported as quickly as possible, but within 24 hours of the discovery of the failure.
5. Any unplanned event which is anticipated to cause a schedule slippage or cost increase significant to the project is to be reported within 24 hours.
6. Any verbal or written Notice of Violation of any Environmental, Safety, and Health statutes arising from the performance of this award is to be immediately reported.
7. Any accidental spill or release which is in violation of any Environmental, Safety, and Health statutes arising from the performance of this award is to be immediately reported, but within 24 hours of the discovery of the accident.

8. Any incident which causes a significant process or hazard control system failure, or is indicative of one which may lead to any of the above defined incidents, is to be reported as soon as possible, but within 5 days of discovery.

The requirement to submit Hot Line Reports for the incidents identified in 1, 2, 3, 6, or 7 is for the sole purpose of enabling DOE officials to respond to questions relating to such events from the media and other public.

When an incident is reported in accordance with 4, 5, 6, 7, or 8, the Recipient shall conduct an investigation of its cause and make an assessment of the adequacy of resultant action. A written report is required no later than ten (10) calendar days following the incident and shall include an analysis of the pertinent facts regarding the cause, and a schedule of the remedial events and time periods necessary to correct the action.

When an event results in the need to issue a written or verbal statement to the local media, the statement is to be cleared first; if possible, and coordinated with NETL Management and Communications Division, the Contracting Officer Representative (COR) and the Contracting Officer.

4.25 JOURNAL ARTICLES, CONFERENCE PAPERS AND PROCEEDINGS GENERATED BY LARGE BUSINESSES FOR DOE REVIEW (DEC 1999)

The Recipient shall submit to DOE for review and approval all documents generated by the Recipient, or any subcontractor, which communicate the results of scientific or technical work supported by DOE under this award, whether or not specifically identified in the award, prior to submission for publication, announcement, or presentation. Such documents include journal articles, conference papers and proceedings, etc. Each such document shall be accompanied by a properly completed NETL Form 2050.4, "Request for Patent Clearance for Release of Contracted Research Documents."

The Recipient shall simultaneously submit a draft version of the document to the DOE COR and the DOE Patent Counsel Office prior to the publication, presentation, or announcement. The document submitted to the DOE Patent Counsel shall be accompanied by a completed NETL Form 2050.4. The DOE COR and DOE Patent Counsel shall review the draft version of the document and notify the Recipient of approval or recommended changes. The approved final version shall be submitted to the NETL AAD Document Control Coordinator.

The following information shall be provided for conference papers and proceedings, etc.

- Name of conference
- Location of conference (city, state, and country)
- Date of conference (month/day/year)
- Conference sponsor

4.26 JOURNAL ARTICLES, CONFERENCE PAPERS AND PROCEEDINGS GENERATED BY A SMALL BUSINESS OR NONPROFIT ORGANIZATION FOR DOE REVIEW (DEC 1999)

The Recipient shall submit to DOE for review and approval all documents generated by the Recipient, or any subcontractor, which communicate the results of scientific or technical work supported by DOE under this award, whether or not specifically identified in the award, prior to submission for publication, announcement, or presentation. Such documents include journal articles, conference papers and proceedings, etc. Each such document shall be accompanied by a properly completed NETL Form 2050.4, "Request for Patent Clearance for Release of Contracted Research Documents."

The Recipient shall submit a draft version of the document to the COR prior to the publication, presentation, or announcement. The COR shall review the draft version of the document and notify the Recipient of approval or recommended changes. The final version, along with a completed NETL Form 2050.4, shall be submitted to the NETL AAD Document Control Coordinator.

The following information shall be provided for conference papers and proceedings, etc.

- Name of conference
- Location of conference (city, state, and country)
- Date of conference (month/day/year)
- Conference sponsor

4.27 JOURNAL ARTICLES, CONFERENCE PAPERS AND PROCEEDINGS GENERATED BY A UNIVERSITY FOR DOE REVIEW (DEC 1999)

The Recipient shall submit to DOE for review and comment all documents generated by the Recipient, or any subcontractor, which communicate the results of scientific or technical work supported by DOE under this award, whether or not specifically identified in the award, prior to submission for publication, announcement, or presentation. Such documents include journal articles, conference papers and proceedings, etc. Each such document shall be accompanied by a properly completed NETL Form 2050.4, "Request for Patent Clearance for Release of Contracted Research Documents."

The Recipient shall submit a draft version of the document to the COR prior to the publication, presentation, or announcement. The COR shall review the draft version of the document and notify the Recipient of recommended changes. The final version, along with a completed NETL Form 2050.4, shall be submitted to the NETL AAD Document Control Coordinator.

The following information shall be provided for conference papers and proceedings, etc.

- Name of conference
- Location of conference (city, state, and country)
- Date of conference (month/day/year)
- Conference sponsor

4.28 ATTACHMENT C -- BUDGET PAGES (DEC 1999)

The budget documents (DOE Form 4620.1, er F4620.1A, SF424 or the DOE 4600.4) will be inserted on this page upon award.

The Applicant must prepare the budget documents and include them in Volume I - Business and Financial Application. These documents and instructions for completion of the documents can be found on the NETL Homepage at: <http://www.netl.doe.gov/business/forms/forms.html>.

4.29 ATTACHMENT D -- RECIPIENT ACQUIRED PROPERTY (AUG 1999)

Recipient acquired property will be listed on this page upon award.

<u>Item No.</u>	<u>Description</u>	<u>Est. Cost</u>
	TO BE DETERMINED	

4.30 ATTACHMENT E -- GOVERNMENT FURNISHED PROPERTY (AUG 1999)

----- N O N E -----

SECTION V -- CONDITIONS AND NOTICES

5.1 NUMBER AND TYPE OF AWARDS (JAN 2000)

It is anticipated that there will be two-three (2-3) awards resulting from this solicitation. However, the Government reserves the right to fund, in whole or in part, any, all, or none of the applications submitted in response to this solicitation and will award that number of financial assistance instruments which serves the public purpose and is in the best interest of the Government. The Government intends to use Cost-Shared Cooperative Agreements as the type of award instrument(s).

5.2 COST SHARING REQUIREMENTS (DEC 1999)

In accordance with 10 CFR 600.30, the DOE has determined that a minimum cost share for this project is twenty percent (20%). Cost sharing must meet the requirements of 10 CFR 600.123 and 10 CFR 600.224. Allowable costs for cost sharing shall be in accordance with 10 CFR 600.127 and 10 CFR 600.222.

5.3 CONTENT OF RESULTING AWARD (JULY 1999)

Any agreement awarded as a result of this solicitation will contain Sections I-IV of this solicitation and shall be subject to the terms and conditions addressed therein, as applicable.

Blank areas appearing in this solicitation, indicated by "[TBD]" will be completed after negotiations.

5.4 APPLICATION PREPARATION COSTS (DEC 1999)

This solicitation does not obligate the Government to pay any costs incurred in the preparation and submission of applications, or in making necessary studies or designs for the preparation thereof or to acquire, or contract for any services.

5.5 COMMITMENT OF PUBLIC FUNDS (AUG 1999)

The Contracting Officer is the only individual who can legally commit the Government to the expenditure of public funds in connection with the proposed award. Any other commitment, either explicit or implied, is invalid.

5.6 AVAILABILITY OF FUNDS (AUG 1999)

It is estimated that DOE funding of \$1,000,000 to \$1,500,000 per award will be available for award under this solicitation, subject to the availability of funds.

5.7 PRE-APPLICATION CONFERENCE IS NOT PLANNED (JULY 1999)

A pre-application conference is not contemplated.

5.8 FALSE STATEMENTS (AUG 1999)

Applications must set forth full, accurate, and complete information as required by this solicitation. The penalty for making false statements in applications is prescribed in 18 U.S.C. 1001.

5.9 AMENDMENTS TO SOLICITATION (DEC 1999)

The only method by which any term of this solicitation may be amended is by an express, formal amendment generated by the issuing office. No other communication, whether written or oral will amend or supersede the terms of this solicitation.

Amendments to the solicitation will be posted on NETL's Homepage @ <http://www.netl.doe.gov/business/solicit/>.

5.10 CATALOG OF FEDERAL DOMESTIC ASSISTANCE NUMBER (CFDA) (AUG 1999)

The CFDA No. is 81.089

5.11 APPLICANT ELIGIBILITY (AUG 1999)

All responsible individuals, corporations, non-profit organizations, educational institutions, and state or local governments may submit applications for consideration.

5.12 PARTICIPATION BY FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS (FFRDC) AND DEPARTMENT OF ENERGY (DOE) MANAGEMENT AND OPERATIONS (M&O) CONTRACTORS (JAN 2000)

A. Proposed Use of a DOE M&O Contractor

Applications submitted by, or substantially relying upon the technical expertise of, FFRDCs and DOE M&O contractors are not desired, will not be evaluated, and will not be eligible for an award under this solicitation. Applicants are encouraged to maximize the use of private sector organizations in the performance of the proposed effort. However, an application that includes performance by an FFRDC or DOE M&O contractor(s) as a subcontractor will be evaluated and may be considered for award, provided that: (1) the proposed use of any such entities is specifically authorized by the cognizant agency for the FFRDC or DOE for DOE M&O contractors, in accordance with the procedures established for the FFRDC or the M&O contractor; (2) the work is not otherwise available from the private sector; and (3) the estimated cost of the FFRDC or M&O contractor work does not exceed 25 percent of the total estimated project cost. DOE reserves the right to fund the work through a DOE field work proposal or an interagency agreement.

B. Application Submission Requirements

In addition to the application information to be provided by the applicant as set forth in other parts of this Section V, the following requirements apply:

1. Justification.

The applicant shall submit a letter with its application (Volume I) which states that to the best of its knowledge, the work requested will not place the FFRDC or the DOE M&O contractor in direct competition with the domestic private sector, and that the proposed scope of work cannot be performed by any private entity.

2. Work Scope.

The applicant shall submit a detailed scope of work which clearly identifies that portion of the proposed effort for which the expertise and ability to perform lie solely with the DOE M&O contractor. This detailed scope of work shall be provided as an appendix to the Volume II, Technical Application.

3. Cost Information.

The applicant shall provide cost information for that portion of the proposed work scope (see 2, above) to be performed by the DOE M&O contractor. The cost information shall be furnished in the same format and level of detail as prescribed for subcontractors. The estimated cost of the effort shall be clearly identified in the Volume I, Business and Financial Application.

4. Authorization from the DOE Contracting Officer

The applicant must submit a document from the DOE Contracting Officer or authorized designee stating that the M&O contractor is authorized to participate in the proposed effort.

5.13 TIME, DATE AND PLACE APPLICATIONS ARE DUE (DEC 1999)

Applications shall be submitted in paper media in sealed envelopes or packages addressed to the office and point of contact specified below:

APPLICATIONS MUST BE RECEIVED AT THE FOLLOWING MAILING ADDRESS NO LATER THAN APRIL 24, 2000, 4:00 P.M. EST.

U. S. Department of Energy
National Energy Technology Laboratory
ATTN: Donna J. Jaskolka
P. O. Box 10940
626 Cochrans Mill Road (Bldg 921, Room 118)
Pittsburgh, PA 15236-0940

Point of Contact : Donna J. Jaskolka
Telephone Number: 412/386-6106
Fax Number: 412/386-6137
E-MAIL Address: Jaskolka@netl.doe.gov
Contracting Officer: Richard D. Rogus

External Marking of Applications

Applications shall be marked with the following information:

- (1) Address of Proposer
- (2) Solicitation Number
- (3) Due Time and Date of Applications
- (4) Point of Contact at Issuing Office
- (5) Area of Interest

5.14 FEE AND PROFIT (JULY 1999)

Fee or profit will not be paid to the recipients of financial assistance awards resulting from this solicitation.

5.15 DETERMINATION OF RESPONSIBILITY (AUG 1999)

DOE will evaluate the potential Recipient's responsibility before award. Responsibility determinations are focused on the Recipient's capability to manage and account for the funds, property and other assets provided to perform satisfactorily under the terms of the award. If a potential Recipient is determined to not be in compliance or cannot or will not comply with generally applicable requirements (see 10 CFR Part 600, Appendix A), the contracting officer will find the Recipient not responsible and may either disapprove the application or use special restrictive conditions as a term of award.

5.16 TREATMENT OF PROPRIETARY INFORMATION (AUG 1999)

An application may include technical data and other data, including trade secrets and/or privileged or confidential commercial or financial information, which the applicant does not want disclosed to the public or used by the Government for any purpose other than application evaluation. To protect such data, the applicant should specifically identify each page including each line or paragraph thereof containing the data to be protected and mark the cover sheet of the application with the following Notice as well as referring to the Notice on each page to which the Notice applies:

NOTICE OF RESTRICTION ON DISCLOSURE AND USE OF DATA

The data contained in pages [TBD] of this application have been submitted in confidence and contain trade secrets or proprietary information, and such data shall be used or disclosed only for evaluation purposes, provided that if this applicant receives an award as a result of or in connection with the submission of this application, DOE shall have the right to use or disclose the data therein to the extent provided in the award. This restriction does not limit the Government's right to use or disclose data obtained without restriction from any source, including the applicant.

DOE shall not refuse to consider an application solely on the basis that the application is restrictively marked.

5.17 TELEGRAPHIC AND E-MAIL APPLICATIONS (AUG 1999)

Telegraphic applications will **NOT** be considered although applications may be amended by telegraphic notice provided such notice is received prior to the date and time specified for receipt. The term "Telegraphic"

includes both mailgrams and facsimile submissions. Applications submitted by E-mail or other electronic means will **NOT** be considered.

5.18 LATE APPLICATIONS, AMENDMENTS AND WITHDRAWALS OF APPLICATIONS (JAN 2000)

An application or amendment of an application shall be timely if it is received at the location on or before the deadline date and time specified in this section.

Applications or amendments of applications may be withdrawn by written notice at any time before award. Written notice includes E-mails and facsimiles. An authorized representative may withdraw applications in person, if the representative's identity is made known and the representative signs a receipt for the application before award.

5.19 EVALUATION PERSONNEL (AUG 1999)

Applications will be evaluated in accordance with the criteria set forth in Section VII of the solicitation. In conducting this evaluation, the Government may utilize, in accordance with the requirements of 10 CFR Part 600, assistance and advice from qualified personnel from other Federal Agencies, DOE Contractors, universities and industry. **Applicants shall indicate in Volume I if they do not wish to have their applications evaluated by nonfederal personnel. Applicants are further advised that DOE may be unable to consider an application withholding such consent.**

5.20 DOE TREATMENT OF APPLICATION INFORMATION (JULY 1999)

When using personnel from other Federal agencies, DOE contractors, or other consultants to DOE in the evaluation of applications, DOE will obtain assurances from all evaluators that DOE's commitments are met relating to the proprietary nature of any application information.

5.21 APPLICATION CLARIFICATION (JULY 1999)

DOE reserves the right to require applications to be clarified or supplemented to the extent considered necessary either through additional written submissions or oral presentations.

5.22 AWARD WITHOUT DISCUSSIONS (AUG 1999)

Notice is given that award may be made after few or no exchanges, discussions or negotiations. Therefore, all applicants are advised to submit their most favorable application to the Government.

5.23 GOVERNMENT RIGHT TO REJECT OR NEGOTIATE (JULY 1999)

The Government reserves the right, without qualification, to reject any or all applications received in response to this solicitation and to select any application, in whole or in part, as a basis for negotiation and or award.

5.24 ANTICIPATED SELECTION AND AWARD DATES (AUG 1999)

It is anticipated that selections for award will be made on [INSERT DATE]. Awards are expected to be made within ninety (90) calendar days following the selection.

5.25 NOTIFICATION TO UNSUCCESSFUL APPLICANTS (AUG 1999)

Written notice will be provided to unsuccessful applicants after selection in accordance with 10 CFR 600.19. Information about selected projects will be made publicly available.

5.26 APPLICATION ACCEPTANCE PERIOD (AUG 1999)

The minimum application acceptance period shall be 180 calendar days after the deadline(s) for receipt of applications.

5.27 DISPOSITION OF APPLICATIONS (AUG 1999)

Applications will not be returned unless they are timely withdrawn.

5.28 PRESUBMISSION REVIEW AND CLEARANCES (AUG 1999)

Presubmission review under Executive Order 12372, "Intergovernmental Review of Federal Programs" is not required.

5.29 PROJECT PERIOD (AUG 1999)

The Government anticipates the project period for the subject awards to be twelve months to three years. Awards will have project and budget periods that are specific to the project and funding. Awards longer than one year will include continuation periods which will be subject to the availability of funds.

5.30 SIMPSON-CRAIG AMENDMENT (AUG 1999)

Organizations which are described in section 501(c)(4) of the Internal Revenue Code of 1986 and engage in lobbying activities after December 31, 1995, shall not be eligible for the receipt of Federal funds constituting an award, grant, or loan. Section 501(c)(4) of the Internal Revenue Code of 1986 covers:

"Civic leagues or organizations not organized for profit but operated exclusively for the promotion of social welfare, or local associations of employees, the membership of which is limited to the employees of a designated person or persons in a particular municipality, and the net earnings of which are devoted exclusively to charitable, educational or recreational purposes."

Lobbying activities are defined broadly to include, among other things, contacts on behalf of an organization with specified employees of the Executive Branch and Congress with regard to Federal legislative, regulatory and program administrative matters.

5.31 LOANS NOT AVAILABLE (JULY 1999)

Loans are not available under the DOE Minority Economic Impact (MEI) loan program, 10 CFR Part 800, to finance the cost of preparing a financial assistance application.

5.32 DEBRIEFINGS (AUG 1999)

Each unsuccessful applicant will be offered the opportunity for an explanation or debriefing as to why the application was not selected. Requests for comments should be made in writing within ten (10) days following notification of an application's selection/rejection for award. Debriefings will be conducted at the earliest feasible time.

5.33 NATIONAL ENVIRONMENTAL POLICY ACT STRATEGY (DEC 1999)

The National Environmental Policy Act of 1969 (NEPA) establishes a national policy to ensure that consideration is given to environmental values and factors in Federal planning and decision making. The Department of Energy's policy is to comply fully with the letter and spirit of NEPA. To ensure that environmental factors are considered in the decision making process and to promote environmentally responsible decisions, DOE incorporates NEPA requirements early in the planning process for proposed actions. Consistent with Council on Environmental Quality (CEQ) NEPA regulations (40 CFR Parts 1500-1508) and DOE NEPA regulations (10 CFR Part 1021), an overall strategy for compliance with NEPA has been developed. This includes performing project-specific environmental reviews under 10 CFR 1021.216 of environmental issues pertinent to each proposed project before projects are selected, followed by site-specific environmental reviews under NEPA of each project after DOE selection. It is probable that most, if not all, of the projects proposed under this solicitation will not have a significant effect on the environment, and as such, in accordance with DOE NEPA regulations, will be candidates for "categorical exclusions" (CX) and thus will not require the preparation of an environmental assessment or environmental impact statement. A CX is prepared for actions that obviously do not have a significant environmental impact. To qualify for a CX, a project must be an excluded action and meet certain site-specific criteria. These criteria concern adverse effects on flood plains, wetlands, archeological sites, Indian lands, etc. For further information on categorical exclusions, see 10 CFR Part 1021.410.

No action taken by DOE with regard to any application prior to the completion of the site-specific analysis, including project selection or award, shall be a final decision for purposes of compliance with NEPA.

5.34 PRE-SELECTION PROJECT-SPECIFIC ENVIRONMENTAL QUESTIONNAIRE (DEC 1999)

For Applications that undergo comprehensive evaluation, DOE will review under 10 CFR 1021.216, project-specific environmental information supplied by the applicant on the Environmental Questionnaire which is submitted as part of Volume I, Business and Financial application. The environmental information provided by the applicant is independently evaluated by DOE and documented in the form of an environmental critique, which may also include supplemental information developed by DOE. Subsequently, DOE prepares a publicly available environmental synopsis to document the consideration given to environmental factors and to record that the relevant environmental consequences of reasonable alternatives have been evaluated in the selection process.

5.35 POST-SELECTION ENVIRONMENTAL REVIEW (DEC 1999)

Soon after selection, which shall be contingent as specified in 10 CFR 1021.216(i), depending on the information necessary to satisfy NEPA, applicants may be requested to provide additional environmental information which is more detailed than that provided on the Environmental Questionnaire of this solicitation. This detailed site-and project-specific information may be used as the basis for site-specific NEPA documents prepared by DOE for each selected project. Such NEPA documents shall be prepared, considered, and published by DOE in full conformance with the requirements of the CEQ regulation and DOE NEPA regulations. DOE must complete its appropriate NEPA process before a go/no go decision and before a recipient may proceed with detailed design under the award.

5.36 POST-AWARD ENVIRONMENTAL MONITORING (DEC 1999)

Each resulting award will specify the monitoring and reporting requirements necessary to ensure compliance with applicable environmental regulations, and permits obtained from Federal, state and local government agencies and DOE NEPA regulations.

5.37 52.227-6 ROYALTY INFORMATION. (APR 1984)

(a) Cost or charges for royalties. When the response to this solicitation contains costs or charges for royalties totaling more than \$250, the following information shall be included in the response relating to each separate item of royalty or license fee:

- (1) Name and address of licensor.
- (2) Date of license agreement.
- (3) Patent numbers, patent application serial numbers, or other basis on which the royalty is payable.
- (4) Brief description, including any part or model numbers of each contract item or component on which the royalty is payable.
- (5) Percentage or dollar rate of royalty per unit.
- (6) Unit price of contract item.
- (7) Number of units.
- (8) Total dollar amount of royalties.

(b) Copies of current licenses. In addition, if specifically requested by the Contracting Officer before execution of the contract, the offeror shall furnish a copy of the current license agreement and an identification of applicable claims of specific patents.

5.38 952.227-84 NOTICE OF RIGHT TO REQUEST PATENT WAIVER. (FEB 1998)

Offerors have the right to request a waiver of all or any part of the rights of the United States in inventions conceived or first actually reduced to practice in performance of the contract that may be awarded as a result of this solicitation, in advance of or within 30 days after the effective date of contracting. Even where such advance waiver is not requested or the request is denied, the contractor will have a continuing right under the

contract to request a waiver of the rights of the United States in identified inventions, i.e., individual inventions conceived or first actually reduced to practice in performance of the contract. Domestic small businesses and domestic nonprofit organizations normally will receive the patent rights clause at DEAR 952.227-11 which permits the contractor to retain title to such inventions, except under contracts for management or operation of a Government-owned research and development facility or under contracts involving exceptional circumstances or intelligence activities. Therefore, small businesses and nonprofit organizations normally need not request a waiver. See the patent rights clause in the draft contract in this solicitation. See DOE's patent waiver regulations at 10 CFR part 784.

5.39 NOTICE REGARDING ELIGIBLE/INELIGIBLE ACTIVITIES (AUG 1999)

Eligible activities under this program include those which describe and promote the understanding of scientific and technical aspects of specific energy technologies, but not those which encourage or support political activities such as the collection and dissemination of information related to potential, planned or pending legislation.

5.40 UNNECESSARILY ELABORATE APPLICATIONS (JULY 1999)

Unnecessarily elaborate brochures or other presentations beyond those sufficient to present a complete and effective response to this solicitation are not desired and may be construed as an indication of the applicant's lack of cost consciousness. Elaborate art work, expensive paper and bindings, and expensive visual and other presentation aids are neither necessary nor wanted.

SECTION VI -- APPLICATION PREPARATION INSTRUCTIONS

6.1 APPLICATION PREPARATION INSTRUCTIONS -- GENERAL (JULY 1999)

The application shall be prepared as set forth herein to provide a standard basis for evaluation and to insure that each application will be uniform as to format and sequence. These instructions are not to be included in your application.

Applications shall be prepared in accordance with this section. To aid in evaluation, applications shall be clearly and concisely written as well as being neat, indexed (cross-indexed as appropriate) and logically assembled. All pages of each part shall be appropriately numbered and identified with the name of the applicant, the date and the solicitation number to the extent practicable. Each volume is a stand alone document, therefore, some information provided may need to be included in both volumes.

Applications must clearly identify the Area of Interest being responded to. Each application should clearly demonstrate the applicant's capability, knowledge, and experience in regard to the requirements described herein. Failure to respond or follow the instructions regarding the organization and content of the application may result in the application being deemed unacceptable.

DOE may return an application that does not include all information and documentation required by statute, 10 CFR Part 600, or the solicitation when the nature of the omission precludes review of the application. During the review of a complete application, DOE may request the submission of additional information if the information is essential to evaluate the application.

6.2 OVERALL ARRANGEMENT OF APPLICATION (AUG 1999)

The overall application shall consist of two (2) physically separated volumes, individually entitled as stated below. Submit the required number of each application volume shown in the matrix below.

<u>VOLUME</u>	<u>ORIGINAL</u>	<u>NUMBER OF COPIES</u>
Volume I -- Business and Financial Application	1	4
Volume II -- Technical Application	1	4

6.3 VOLUME I -- BUSINESS AND FINANCIAL APPLICATION PREPARATION INSTRUCTIONS (DEC 1999)

Volume I consists of an application coversheet, application forms, assurances, budget pages, environmental questionnaire, exceptions and deviations to the model award, and any other business and financial information.

The application identified as the original shall contain all original signatures of all documents requiring signatures by the offeror. Use of reproductions of signed originals is authorized in all other copies of the application.

The applicant shall not provide application information in three-ring binders.

Format and Content.

ALL FORMS NEEDED FOR PREPARATION OF VOLUME I ARE FOUND ON THE NETL HOMEPAGE AT: <http://www.netl.doe.gov/forms/forms.html>. PLEASE NOTE THAT ALL FORMS WERE DEVELOPED USING WORDPERFECT 6.1 AND FORMATTED FOR PRINTING USING A HP LASERJET III Si PRINTER. INSTRUCTIONS FOR COMPLETION OF THE FORMS ARE CONTAINED ON THE BACK OF EACH FORM. QUESTIONS ON COMPLETION OF THE FORMS SHOULD BE ADDRESSED TO THE CONTRACT SPECIALIST.

Volume I shall include the following documents (in the order listed):

1. VOLUME I BUSINESS AND FINANCIAL APPLICATION COVERSHEET

The Application Coversheet for Volume I shall contain the following information:

Solicitation Number
Due Time and Date of Applications

Name and Address of Proposer
Point of Contact
Telephone/FAX Number/E-mail Address
Title of Project
Program Area of Interest (if applicable)
Notice of Restriction on Disclosure and Use of Data (See Section V)

2. APPLICATION FOR FEDERAL ASSISTANCE Standard Form 424# -- **Form # SF424**
3. FINANCIAL ASSISTANCE ASSURANCE PACKAGE -- **Form #: assure.fa**
4. BUDGET PAGE(S)

The applicant must provide detailed budget information on one or more of the following budget forms. The detailed budget shall encompass the entire proposed project, with written justification sufficient to allow an evaluation of the itemized list of costs provided. Supporting cost data shall be submitted as indicated by the instructions.

Failure to provide the detailed cost information as described in the instructions will result in an incomplete package. If a minimum cost share is required by this solicitation, the applicant shall stipulate in the application the source and amount of cost sharing and the value of third party in-kind contributions proposed to meet the requirement.

- a. Federal Assistance Budget Information -- DOE F 4600.4 -- **Form #D4600.4**
 - b. Budget Page DOE F 4620.1 -- **Form # D4620.1**
 - c. Grant Application Project Period Summary ER F 4620.1A -- **Form #ERF4620**
 - d. Budget Information -Non-Construction Programs -- SF424a -- **Form #SF424a**
5. ENVIRONMENTAL QUESTIONNAIRE -- **Form # nepasol**
 6. ACKNOWLEDGMENT OF AMENDMENTS

The applicant shall specifically indicate their acknowledgment and receipt of the amendment(s) posted on the NETL Website at **<http://www.netl.doe.gov/business/solicit/>** by signing the amendment and including it in Volume I or stating the receipt of the amendment in the text of Volume I.

7. ADDITIONAL APPLICATION SUBMISSION REQUIREMENTS FOR FFRDC'S, DOE M&O CONTRACTORS OR LABORATORY ENTITIES

In addition to the application information to be provided by the applicant as set forth in other parts of this Section, the following additional requirements apply for Federally Funded Research and Development Centers (FFRDC's), DOE M&O Contractors, and/or laboratory entities :

1. **Justification.**

The offeror shall submit a letter with its application (Volume I) which states that to the best of its knowledge, the work requested will not place the FFRDC or the DOE M&O contractor in direct competition with the domestic private sector, and that the proposed scope of work cannot be performed by any private entity.

2. **Work Scope.**

The offeror shall submit a detailed scope of work which clearly identifies that portion of the proposed effort for which the expertise and ability to perform lie solely with the DOE M&O contractor, FFRDC's or laboratory. This detailed scope of work shall be provided as an appendix to the **Volume II, Technical Application.**

3. Cost Information.

The offeror shall provide cost information for that portion of the proposed work scope (see 2, above) to be performed by the DOE M&O contractor. The cost information shall be furnished in the same format and level of detail as prescribed for subcontractors. The estimated cost of the effort shall be clearly identified in the Volume I, Business and Financial Application.

8. EXCEPTIONS AND DEVIATIONS TAKEN TO THE MODEL AGREEMENT

The offeror shall identify and explain any exceptions or deviations taken or conditional assumptions made with respect to the model agreement, the requirements of this Section, and other matters included in Volume I.

Any exceptions taken must contain sufficient amplification and justification to permit evaluation. The benefit to the Government shall be explained for each exception taken. Such exceptions will not, of themselves, automatically cause an application to be termed unacceptable. A large number of exceptions, or one or more significant exceptions not providing benefit to the Government, however, may result in rejection of your application(s) as unacceptable.

NOTE: Applicants are specifically directed to review Section III, Intellectual Property Provisions, of the model agreement.

9. SUMMARY OF EXCEPTIONS AND DEVIATIONS TAKEN IN OTHER VOLUMES

The offeror shall summarize each technical, cost, business, or other exceptions taken elsewhere, and provide specific cross references to its full discussion.

6.4 VOLUME II-- TECHNICAL APPLICATION PREPARATION INSTRUCTIONS (AUG1999)

The proposer shall include a technical discussion in the format specified below. This format relates to the technical evaluation criteria found in Section VII. Alternate heading names and additional headings may be included as desired.

In order to produce a comprehensive application for this solicitation, the applicant should address, at a minimum, the areas listed below. To help facilitate the review process and to insure addressing all the review criteria, the applicant shall use the following Table of Contents when preparing the technical application.

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6.5 PUBLIC ABSTRACT (JULY 1999)

This section shall contain a public abstract of not more than one (1) typewritten page clearly stating the objectives of research, the title of the project, methodology, and sponsoring organization (s). It is a stand-alone document. This abstract may be released to the public by DOE in whole or in part any time. It is, therefore, required that it shall not contain proprietary data or confidential business information.

6.6 GENERAL TECHNICAL INFORMATION (DEC 1999)

The technical application will consist of the applicant's outline addressing the technical and management aspects of the assistance action, the applicant's capabilities and what the applicant will do to satisfy the requirements of the Statement of Project Objectives. Since the technical information contained in this section will be evaluated to determine such matters as understanding of the work to be performed, technical approach, and potential for completing the desired work, it should be specific and complete in every detail. The application should be practical and be prepared simply and economically, providing a straightforward, concise delineation of what it is the applicant will do to satisfy the requirements of the Statement of Project Objectives.

In order that the Technical Application may be evaluated strictly on the merit of the material submitted, **no cost information is to be included in the Technical Application**. Where estimated man-hours will provide clarity, they shall be quoted in man-hour figures only, with no indication as to the cost of these man-hours.

The application shall not merely offer to perform work in accordance with the Statement of Project Objectives but shall describe the actual work proposed.

The Technical Application shall not exceed fifty (50) pages. The application shall contain only single-sided pages. The statement of project objectives, resumes and additional pertinent publications are to be attachments to the Technical Application and will not be included in the page limitation. Pages in excess of the page limitation will be removed from the application, discarded prior to evaluation, and will not be evaluated. The proposed text shall be typed, single-spaced, using a 12 pt computer font, such as Times New Roman, Courier or equivalent, and printed, unreduced on size 8 1/2-inch by 11-inch paper. Illustrations shall be legible and no longer than 11-inch by 17-inch foldouts, as appropriate for the subject matter. Each 11-inch by 17-inch foldout is considered two pages when determining the number of pages. Pages of each volume shall be sequentially numbered with the volume and page numbers on each page. Except as otherwise noted in the solicitation, the page guidelines previously set forth constitute a limitation on the total amount of material that may be submitted for evaluation. No material may be incorporated in any application by reference as a means to circumvent the page limitation.

All measurements described in the application shall be expressed in the metric (SI) system with the customary unit conversion in parentheses. Additionally, applicants are hereby notified that any instrumentation associated with tasks which will be performed will be required to be in the SI system and all technical reporting will require information in the SI system.

The applicant shall provide the technical information as follows:

Technical Merit of the proposed effort. The applicant shall demonstrate the technical merit and technical content of the proposal by: **(a)** effectively describing the proposed computational model framework, methodology, experimental effort, analysis, and usefulness of the proposed work toward demonstrating how successful completion of the technical proposal would achieve the goals and objectives established for the area of interest under consideration. The proposal must focus on describing how the proposed research will be used for design, evaluation, and development of advance combustion systems that have high potential to meet Vision 21 goals. **(b)** including concept description, analysis, and model results as necessary to illustrate the specifics of the proposed effort. Include data from applicable previous developmental work that relates and exemplifies responsiveness and relevance to this solicitation. The offeror must discuss any limitations of the data presented (e.g., margins of error, confounding conditions, etc.), identify the technical aspects that require further development, specify the methods of investigation to be used, and the anticipated value and applicability of the project results to the goals and objectives of the solicitation.

Technical Approach. The offeror shall demonstrate the validity of the technical approach of the proposal by including discussions and supporting information that show:

(a) The types of experiments that need to be completed, the data that will be collected, the specifics of data collection (e.g. time and space resolution required for valid results) and how this data will be used in the computational and ASPEN models to describe and design combustion systems that have a high potential to meet Vision 21 goals.

(b) A detailed statement of work (SOW) that allows an evaluator to determine the quality, quantity, completeness, and realism of work being proposed. The proposed SOW shall clearly describe and support in narrative form the work to be performed including 1) details regarding the type, size, and availability of equipment to be used, the quality of the expected data, the range of the operating conditions, the number of variables and levels to be tested, the length of the test run period, sampling and sample analysis schemes, and the plan for evaluating the effectiveness of the proposed technology, process, or concept toward meeting the goals Vision 21 combustion systems, 2) detailed project and milestone schedules, deliverables, and a work breakdown structure (WBS), 3) a labor distribution plan, and 4) a detailed description of facilities, equipment, support personnel and other resources and how they will be applied to the proposed SOW.

(c) The environmental, safety, and health (ES&H) activities as they relate to the proposed effort. Include the effect of these activities on the project cost, work scope, performance, and schedule.

(d) The quality assurance activities associated with the proposed effort. Include discussion on experimental design, data validation, data reliability, and statistical significance as it relates to the proposed effort.

(e) The offeror's proposed technical approach does not duplicate past or current efforts and should make maximum use of existing data, information, and resources. The offeror must demonstrate that productive activity can begin upon award without the need for exhaustive literature searches, extensive laboratory set-up, consultations, or numerous technical visits. Describe the advantages over, and improvements to, competing or differing approaches.,

Qualifications - Key Personnel and Facilities. The offeror shall demonstrate the team's ability to complete the project by including discussions that: (a) describe the credentials, capabilities, and experience of key personnel by including resumes and information consistent with and appropriate to the role that they will play in the conduct of the project; (b) contain a list and brief description of relevant prior or current contracts for the last five years, along with the name and phone number of Contracting Officer Representatives for Government contracts, if any; and (c) describe the facilities including reactors, significant ancillary equipment, sampling and analysis equipment, data acquisition equipment, and other equipment available and applicable for carrying out the proposed effort.

Team Structure and Project Management. The offeror shall demonstrate the team's ability to manage the project by including discussions that: (a) document the rationale, the relevant corporate experience, and the suitability of the proposed teaming arrangements among the participants, including letters of commitment, and detail the level and degree of participation in the project; (b) contain a project organization chart that delineates the responsibilities and lines of authority among the team organization as well as the roles of key personnel and the percentage of time they will be dedicated to the project; and (c) document the roles, integration, leadership, and methods of decision making among the modelers, experimentalists, designers, and technology developers.

6.7 STATEMENT OF PROJECT OBJECTIVES INSTRUCTIONS (DEC 1999)

All applications must contain a single, detailed Statement of Project Objectives that addresses how the project objectives will be met. The Statement of Project Objectives must contain a clear, concise description of all activities to be completed during project performance and follow the structure discussed below.

Applicants shall prepare the Statement of Project Objectives in the following format:

TITLE OF WORK TO BE PERFORMED

(Insert title of work to be performed. Be concise and descriptive.)

A. OBJECTIVES

Include one paragraph on the overall objective(s) of the work. Also, include objective(s) for each phase of the work.

B. SCOPE OF WORK

This section should not exceed one-half page and should summarize the effort and approach to achieve the objective(s) of the work for each Phase.

C. TASKS TO BE PERFORMED

Tasks, concisely written, should be provided in a logical sequence and should be divided into the phases of the project. This section provides a brief summary of the planned approach to this project.

PHASE I

Task 1.0 (Title)

(Description)

Subtask 1.1 (Optional)

(Description)

Task 2.0 - (Title)

PHASE II (Optional)

Task 3.0 - (Title)

D. DELIVERABLES

The periodic, topical, and final reports shall be submitted in accordance with the attached "Federal Assistance Reporting Checklist" and the instructions accompanying the checklist.

The Recipient shall provide a list of deliverables other than those identified on the "Federal Assistance Reporting Checklist" that will be delivered. These reports shall also be identified within the text of the Statement of Project Objectives.

1. Task 1.1 - (Report Description)

2. Task 2.2 - (Report Description)

E. BRIEFINGS/TECHNICAL PRESENTATIONS (If applicable)

1. The Recipient shall prepare detailed briefings for presentation to the COR at the COR's facility located in Pittsburgh, PA or Morgantown, WV. Briefings shall be given by the Contractor to explain the plans, progress, and results of the technical effort.

2. Once per year the Recipient shall provide a briefing to summarize the results of the work performed and to present plans for follow-on work under the Cooperative Agreement. The timing of these briefings shall be at a time mutually agreeable to the government and participant.

3. The Recipient shall provide a final briefing summarizing the accomplishments of the entire project thirty days before award expiration.

4. The Recipient shall provide and present a technical paper(s) at the DOE/NETL Annual Contractor's Review Meeting to be held at the NETL facility located in Pittsburgh, PA or Morgantown, WV.

6.8 TECHNICAL EXCEPTIONS AND DEVIATIONS (JULY 1999)

This section shall identify and explain any exceptions or deviations taken or conditional assumptions made with respect to the technical requirements of the solicitation.

Any exceptions taken must contain sufficient amplification and justification to permit evaluation. All benefits to the Government shall be explained for each exception taken. Such exceptions will not, of themselves, automatically cause a application to be termed unacceptable. However, a large number of exceptions, or one or more significant exceptions not providing benefit to the Government may result in rejection of the application(s) as unacceptable.

SECTION VII -- EVALUATION AND SELECTION

7.1 INTRODUCTION (DEC 1999)

This section of the solicitation contains the evaluation approach as well as the individual criteria to be used in the evaluation of applications.

7.2 GENERAL (JULY 1999)

It is the policy of DOE that any financial assistance be awarded through a merit-based selection process which means a thorough, consistent and independent examination of applications based on pre-established criteria by persons knowledgeable in the field of the proposed project.

7.3 PRELIMINARY EVALUATION (AUG 1999)

Prior to a comprehensive evaluation, applications will undergo an initial review to determine whether the information required by the solicitation has been submitted and is properly completed. Applications will be reviewed for relevance to the [**INSERT PROGRAM NAME**] program and for responsiveness to the technical requirements of the solicitation. Applications that require cost-sharing will be reviewed to insure that this requirement has been met. Volume I of the application will be reviewed to assess the Applicant's eligibility under the lobbying, EPAAct and Simpson-Craig Amendment requirements. Failure to successfully meet any one of these Preliminary Evaluation criteria will result in the elimination of the application and no further consideration in the Comprehensive Evaluation. In the event that an application is eliminated, a notice will be sent to the Applicant stating the reason(s) that the application will not be considered for financial assistance under this solicitation.

7.4 COMPREHENSIVE EVALUATION (AUG 1999)

Applications passing the preliminary evaluation shall be subject to a comprehensive evaluation in accordance with the technical evaluation criteria listed in this section.

The technical evaluation is conducted to determine the merits of the technical application with regard to the potential success of the project as well as future commercial applications. Comprehensive evaluation results in a numerical score for each application against each of the technical evaluation criteria.

The Environmental, Health, Safety, and Security (EHSS) Evaluation, which is not point scored, is conducted to determine the completeness of the Environmental Questionnaire, and to assess the applicant's awareness of EHSS requirements for mitigating project related EHSS risks and impacts.

The cost evaluation, which is not point scored, is conducted to determine the completeness of the cost estimate, appropriateness and reasonableness of the cost, and to assess the applicant's understanding of the Statement of Project Objectives.

7.5 TECHNICAL EVALUATION CRITERIA (AUG 1999)

Technical applications submitted in response to this solicitation will be evaluated and scored in accordance with the criteria listed below:

Criterion 1: Technical Merit and Content

- (a) Clarity and completeness of the technical discussion and relevance to the specific PS objectives
- (b) Adequacy of supporting rationale for the development of the proposed kinetic expressions and models (computational and ASPEN) as they relate to a specific combustion technology, process, or concept
- (c) Adequacy and realism of models used and methods proposed.

Criterion 2: Technical Approach

- (a) Advantages, clarity, validity and potential of proposed approach to achieve the specific PS goals and objectives
- (b) Completeness, quality, appropriateness, and realism of proposed work statement
- (c) Adequacy and realism of the integration among the experiments, models, and reactor design.

Criterion 3: Qualifications - Key Personnel and Facilities

- (a) Adequacy of the facilities, and the credentials, capabilities, and experience of key personnel
- (b) Relevance of prior or current corporate experience and track record

Criterion 4: Team Structure and Project Management

- (a) Clarity and suitability of the responsibilities and lines of authority among team organizations and the role and commitment of key team players
- (b) ability to integrate team with experimentalists, modelers, designers, and technology developers.

7.6 COST EVALUATION CRITERIA (JULY 1999)

The costs proposed will be evaluated in response to this solicitation in order to:

- (a) determine the level of verifiable cost sharing;
- (b) ensure that all work elements included in the Statement of Project Objectives have associated costs, and that those cost appear appropriate and reasonable for the effort proposed; and
- (c) assess the applicant's understanding of the Statement of Project Objectives.

7.7 RELATIVE ORDER OF IMPORTANCE OF EVALUATION CRITERIA (JULY 1999)

The evaluation of the technical application will be conducted using preestablished weights to determine the relative merits of the application in accordance with the technical evaluation criteria. The technical evaluation (Volume II - Technical Application) represents 100% of the total evaluation scoring. Although Volume I - Business and Financial Application will not be point scored it will be considered in the selection decision and must be addressed.

The following weighting factors will be applied to each technical evaluation criteria to obtain a final evaluation rating for each application: Criterion 1 - Technical Merit and Content, 40%; Criterion 2 - Technical Approach, 30%; Criterion 3 - Qualifications--Key Personnel and Facilities, 20%; and Criterion 4 -Team Structure and Project Management, 10%.

7.8 APPLICATION OF PROGRAM POLICY FACTORS (JULY 1999)

These factors, while not indicators of the Applicant's merit, e.g., technical excellence, cost, proposer's ability, etc., may be essential to the process of selecting the application(s) that, individually or collectively, will best achieve the program objectives. Such factors are often beyond the control of the Applicant. Applicants should recognize that some very good applications may not receive an award because they do not fit within a mix of projects which maximizes the probability of achieving the DOE's overall research and development objectives. Therefore, the following Program Policy Factors may be used by the Source Selection Official to assist in determining which of the ranked application(s) shall receive DOE funding support.

1. Selection consideration will be given to those proposals representing a diversity of philosophies and technical approaches.

2. It is desirable to consider for selection that set of proposals that covers both areas of interest described in this Program Solicitation and that will best accomplish DOE's programmatic objectives, taking into account current and planned relevant work sponsored by DOE.

7.9 BASIS FOR SELECTION AND AWARD (AUG 1999)

In selecting applications for award, DOE shall consider the evaluation criteria and the Program Policy Factors set forth in the solicitation to arrive at the best mix of projects that achieve the solicitation program objectives. DOE reserves the right to select all or a portion of an application that meets these objectives.